DEBT, GROSS DOMESTIC PRODUCT AND MONEY IN ST. KITTS AND NEVIS, 1983-1998

By

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PUBLIC DEBT MANAGEMENT AND MONETARY POLICY IN ST. KITTS AND NEVIS

This paper will assess public debt, GDP and Money in St. Kitts and Nevis over the period 1983 to 1998. The idea is to determine if any salient conclusions can be drawn about debt, GDP and Money over that period in light of Domar Macro Debt models. We make two assumptions. Assumption one is that there is an implicit tendency for Debt to GDP to be explosive over time. Assumption two is that debt could be confined to some level if there is some kind of indicative planning of the parameters of growth. These two assumptions and views are liberal interpretations of the Domar Macro Debt Models.

In light of the fact that the period of coverage covers two political regimes and that the period also fell under the unusual conditions of natural disasters, we will determine if the public debt management was ad hoc or deliberate. In the Domar Macro Debt models, there is a passive, almost fatalistic nature about debt and GDP. We will determine if this concept is applicable to the experience in St. Kitts and Nevis from 1983 to 1998 and indeed, if the Domar Macro Debt models can be a point of departure for the control of public debt as it interacts with GDP and money over time.

In the July-December ***Focus,*** The Newsletter of the United Nations System in the Caribbean, the ECLAC, CDCC, a statement was made in an article entitled "The Fiscal Covenant: Strengths, Weaknesses and Challenges. The Caribbean Experience and Action for the Future." We quote a portion of that article below:

> ***Since the 1980's, the traditional fiscal management patterns have undergone fundamental change. As a result of the debt crisis, the State needed to reduce expenditure, make the government apparatus more efficient and divest itself of its non-performing assets, via privatization. The emerging global economy also impacted fiscal policy in several ways, for example trade liberation reduced tariffs...But globalization also forced governments to discipline themselves in a situation where rapid capital flows could either reward or penalize countries in accordance with the appropriateness of their macroeconomic policies. Fiscal discipline needed to take on a permanent character.***[1]

In the above quote, the reference is being made to the entire State sector in Latin America and the Caribbean. But, in our focus, the substance of the quotation has relevance for the State sector of St. Kitts and Nevis. The question is, to what extent was there active planning or inactive planning in the State over the period 1983-1998? If there

[1] ***Focus,*** UN in the Caribbean. The Newsletter of the United Nations System in the Caribbean. Economic Commission for Latin American and the Caribbean. CDCC, UNIC., July-December, 1998.

was active planning or inactive planning, did it make a difference given to the Debt/GDP configuration? Thus we pose a question as follows: Given the above implicit concept regarding debt and fiscal discipline, what was the relationship between Debt, Gross Domestic Product and the Money Supply over the period 1983 to 1998? To answer this question, we propose to use two simple Domar Macroeconomic Debt Models, as first articulated in Evsey Domar, (1957) [***Essays in the Theory of Economic Growth***, New York, Oxford University Press] to get some a handle on the Debt, GDP and Money relationship in St. Kitts and Nevis over the period 1983 to 1998. We selected this period because we were able to use a consistent money supply data series from the Eastern Caribbean Central Bank and compare those data with the Debt and GDP data of St. Kitts and Nevis. Furthermore, 1983 represents the year of independence for St. Kitts and Nevis and, at the same time, the period covers two political regimes.

The two models are simple dynamic macroeconomic models. In the first instance, a simple relationship is expressed between Gross Domestic Product (GDP) and Total External Debt Outstanding (D). The model is as follows[2],

A FIRST DOMAR MACRO DEBT MODEL

$$\frac{dD}{dt} = \alpha y(t) \qquad (1.1)$$

$$\frac{dy}{dt} = \beta \qquad (1.2)$$

$$y(0) = y_0 \qquad (1.3)$$

$$D(0) = D_0 \qquad (1.4)$$

$$\alpha > 0 \quad \beta > 0 \qquad (1.5)$$

where D is the Total External Debt Outstanding and y is GDP. In this model, we assume, like Domar, that GDP increases at a constant rate *β over time,* and that the rate of increase of the Total External Debt Outstanding is a fixed proportion of GDP. Equations three and four are the initial or starting positions.

[2] See Jean E. Draper and Jane S. Klingman, (1967), ***Mathematical Analysis***, pp.431-433.

If we integrate equation (1.2), we obtain

$$y = \beta t + C \qquad (1.6)$$

where C is a constant. When $t = 0$, $y = y_o$ and

$$y = \beta t + y_o \qquad (1.7)$$

If we substitute for y from equation (1.1) into equation (1.7), we will get

$$\frac{dD}{dt} = \alpha\beta t + \alpha y_o \qquad (1.8)$$

From (1.8) we derive $D = \frac{1}{2}\alpha\beta t^2 + \alpha y_o t + C$ (1.9)

Since $D = D_o$ when $t = 0$, then $C = D_o$, thus the Debt, D is

$$D = \tfrac{1}{2}\alpha\beta t^2 + \alpha y_o t + D_o \qquad (1.10)$$

The solutions of these differential equations model for Debt and GDP are:

$$D(t) = \tfrac{1}{2}\alpha\beta t^2 + \alpha y_o t + D_o \qquad (1.11)$$

$$y(t) = \beta t + y_o \qquad (1.12)$$

The Debt to GDP ratio, following Domar and following traditional analysis, is the Debt D(t) divided by the GDP(t). Thus we have from (1.11) and (1.12) above

$$\frac{D(t)}{y(t)} = \frac{\tfrac{1}{2}\alpha\beta t^2 + \alpha y_o t + D_o}{\beta t + y_o}$$

We can show the Debt to GDP ratio as three separate parts, as follows:

$$\frac{D(t)}{y(t)} = \frac{\tfrac{1}{2}\alpha\beta t^2}{\beta t + y_o} + \frac{\alpha y_o t}{\beta t + y_o} + \frac{D_o}{\beta t + y_o}$$

As time approaches infinity, each of the parts of the Debt to GDP ratio approaches a different focus. Thus we have

$$\frac{1/2\alpha\beta t^2}{\beta t + y_o} \rightarrow \infty$$

$$\frac{\alpha y_o t}{\beta t + y_o} \rightarrow \infty$$

$$\frac{D_o}{\beta t + y_o} \rightarrow 0$$

Thus, overall, as time approaches infinity, that is as $t \rightarrow \infty$, the Debt to GDP ratio, that is D(t)/GDP(t) $\rightarrow \infty$. **Given this type of model, the ratio of Total Debt Outstanding to GDP will increase over time without limit.**

A SECOND DOMAR MACRO DEBT MODEL

A second Domar Debt model considers the above model, but with a slight variation on the theme. In this instance, GDP is assumed to increase by a constant proportion. Clearly, this is a case for directional planning as opposed to the arbitrary, ad hoc planning of the previous model. In this case we have the following,

$$\frac{dD}{dt} = \alpha y(t) \qquad (2.1)$$

$$\frac{dy}{dt} = \beta t \qquad (2.2)$$

$$y(0) = y_o \qquad (2.3)$$

$$D(0) = D_o \qquad (2.4)$$

$$\alpha > 0 \quad \beta > 0 \qquad (2.5)$$

Integrating equation (2.2) from above, we get

$$\ln y = \beta t + C \qquad (2.6)$$

$$y = Ce^{\beta t} \qquad (2.7)$$

Now since $y = y_o$ when $t = 0$, $C = y_o$ and

$$y = y_0 e^{\beta t} \qquad (2.8)$$

Now, if we substitute equation (2.8) into equation (2.1) we obtain,

$$\frac{dD}{dt} = \alpha\, y_0 e^{\beta t} \quad + \quad C \qquad (2.9)$$

$$D = \frac{\alpha}{\beta}\, y_0 e^{\beta t} \quad + \quad C \qquad (2.10)$$

Now, since $D = D_o$ when $t = 0$,

$$C = D_o - \frac{\alpha y_o}{\beta} \quad \text{and} \qquad (2.11)$$

$$D = D_o - \frac{\alpha y_o}{\beta} + \frac{\alpha}{\beta}\, y_0 e^{\beta t} \qquad 2.12$$

The solution of this model is thus

$$D(t) = D_o + \frac{\alpha}{\beta}\, y_0 e(^{\beta t - 1)}$$

$$y(t) = y_0 e^{\beta t}$$

In this case, the ratio of Total External Debt Outstanding to GDP is

$$\frac{D(t)}{y(t)} = \frac{D_0}{y_0 e^{\beta t}} + \frac{\alpha\,(1 - 1\,)}{\beta\,(\quad e^{\beta t})}$$

As time approaches infinity, that is, as $t \rightarrow \infty$

$$\frac{D_o}{y_o e^{\beta t}} \rightarrow 0 \quad \text{and} \quad \frac{\alpha\,(1 - 1)}{\beta\,(\quad e^{\beta t})} \rightarrow \frac{\alpha}{\beta}$$

Thus, as t → ∝ , $\frac{D(t)}{y(t)} \rightarrow \frac{\alpha}{\beta}$ **which is a finite constant.**

DATA TO TEST ASSUMPTIONS OF THE MODELS

In Table One we present the data to test some of the underlying assumptions of planning or non-planning in St. Kitts and Nevis, using some of the implicit equations in the two models above. The data cover the period 1983 to 1998. Debt is the Total External Debt Outstanding for St. Kitts and Nevis. The Money Supply is M2. The Gross Domestic Product is GDP at Factor Cost.

TABLE ONE

DEBT, MONEY SUPPLY AND GROSS DOMESTIC PRODUCT (EC$M)

TIME (Years)	DEBT	MONEY	GDP
1983	36.72	66.67	217.16
1984	44.55	92.88	238.11
1985	51.30	123.62	253.44
1986	48.06	147.21	275.85
1987	57.51	171.01	298.66
1988	71.82	206.24	329.58
1989	85.59	258.29	349.40
1990	107.68	279.28	360.31
1991	112.82	288.91	368.46
1992	118.99	333.17	379.83
1992	126.22	374.93	400.41
1994	139.12	390.12	422.05
1995	146.12	438.38	436.65
1996	162.90	462.66	462.41
1997	276.09	525.05	491.54
1998	390.90	545.92*	512.54*

Source: Eastern Caribbean Central Bank, ***National Account Statistics, 1998***;
Monetary from the Research and Information Department of ECCB.
*Estimates.

First, let us look at the ratios of Debt to GDP, Debt to Money Supply and Money to GDP. In Table Two we present those ratios.

TABLE TWO

RATIOS OF DEBT TO GDP, MONEY SUPPLY AND MONEY TO GDP

TIME(Years)	DEBT/GDP	DEBT/M2	M2/GDP
1983	0.1691	0.5508	0.3070
1984	0.1871	0.4797	0.3901
1985	0.2024	0.4150	0.4878
1986	0.1742	0.3265	0.5337
1987	0.1926	0.3363	0.5726
1988	0.2179	0.3482	0.6258
1989	0.2450	0.3314	0.7392
1990	0.2989	0.3856	0.7751
1991	0.3062	0.3905	0.7841
1992	0.3133	0.3571	0.8772
1993	0.3152	0.3366	0.9364
1994	0.3296	0.3566	0.9243
1995	0.3346	0.3333	1.0040
1996	0.3523	0.3521	1.0005
1997	0.5617	0.5258	1.0682
1998	0.7627	0.7160	1.0651

Source: Ratios derived from Table One above.

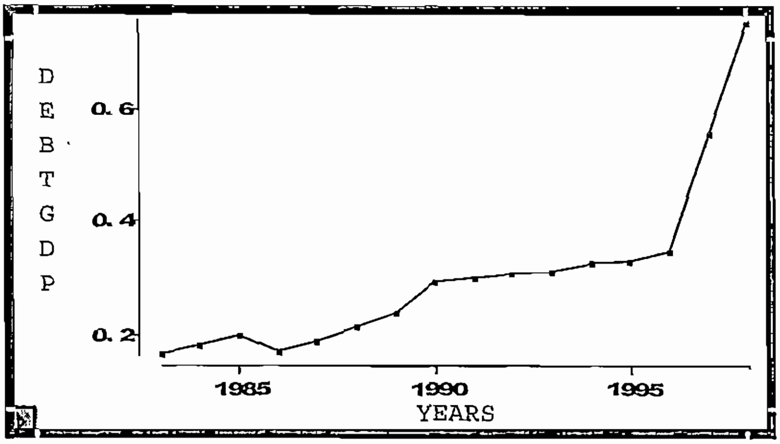
First, we note that the Debt to GDP ratio rose from 16.91 percent in 1983 to 76.27 percent in 1998. From the univariate statistics, we note that the mean is 0.3102, the standard deviation was 0.1555, the skewness is 1.9765, and the coefficient of variation of 50.1325. This explosive growth in the Debt to GDP ratio is symbolic of the point attributable to the first Domar Debt Model. Here, it would seem that if there were planning or no planning, the explosion in the Debt to GDP ratio would still have occurred. This is what we refer to as the fatalistic imperative of Debt to GDP ratio. However, it must be remembered that towards the latter part of the time series, **unusual and irregular occurrences impacted the State.** In this instance, there was what is best described as ***a displacement effect due to the impact of hurricanes on the body economy of the State.*** The upward trend is particularly noticeable beginning in 1991, when the Debt to GDP ratio moved above 30 percent for the first time.

Second, we look at the Debt to Money supply ratio. Here we note that the ratio rose from 55.08 percent to 71.60 percent in 1983. From a practical point of view, these two series may be construed as surrogates or proxies for each other. The same parametric shifts seem to center around 1991, although there was some contraction in the early part of the series. The univariate statistics for this series are as follows: the mean is 0.409; the standard deviation is0.108; skewness of 1.861 and the coefficient of variation of 26.448. Overall, the **correlation coefficient** of these two series is 0.650

Third, we consider the ratio of Money Supply Two, M2, to GDP. Here we note that this ratio increased from 30.70 percent to 106.51 percent in 1998. The univariate statistics for the M2 to GDP ratio are a mean of 0.756; standard deviation of 0.245; skewness of -0.380 and a coefficient of variation of 32.392.

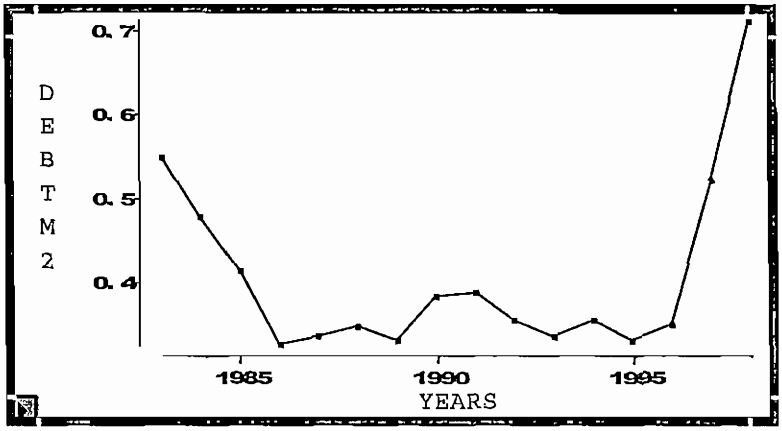
We now look at the graphs of the explosive data over the period of analysis for the three ratios. First we show the Debt to GDP ratio and note that the explosive nature is well articulated from the last three years of the data series, specifically when the economy was grappling with the after effects of the impact of hurricanes. Sometimes, these unusual instances tend to distort data series and hence make planning problematic. This may also suggest that regression analyses run over this period would have take into consideration these unusual circumstances from a planning perspective. It must be noted, however, that the graph below is only a first approximation to what may be the underlying issues in the economy.

Figure One: **DEBT TO GDP RATIO OVER TIME**



Source: **Derived from Table Two.**

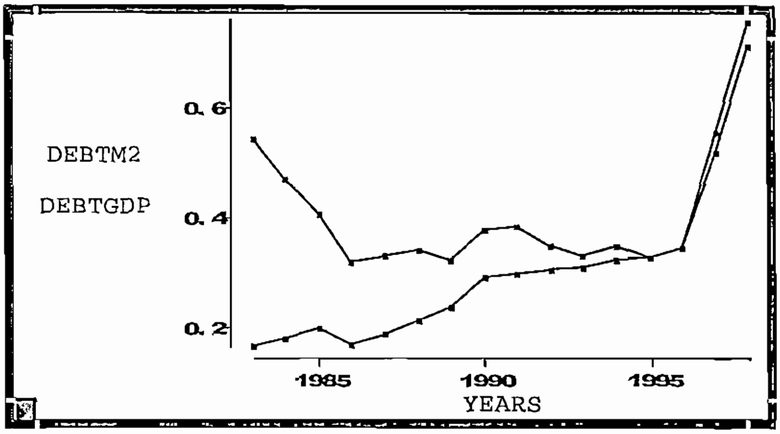
In graph two we observe the explosive nature of Debt to M2 over the period of analysis. Here, however, we note that in the early years there was a contractionary period of the Debt to M2, followed by a almost asymptotic period, and then finally an explosive period. The explosive period almost parallels the Debt to GDP ratio in its explosive period. In graph three we present a comparative picture of graphs one and two.



Source: **Derived from Table Two**

In graph three we show the interaction of the above two ratios. There we note that in the early years when the Debt to Money ratio was falling, the Debt to GDP ratio was rising. There was that noticeable flat period of the Debt to Money period followed by the rapid rise or explosion in the latter part of the series.

Graph Three: **RATIOS OF Debt/GDP AND Debt/M2**



Source: **From Graphs Two and Three.**

REGRESSION ANALYSES.

Let us now turn to some regression analyses to bring all of the pieces into one coherent whole and try to determine if we can make any conclusive statement about Debt to GDP and Debt to Money in St. Kitts and Nevis over the period 1983 to 1998. We are going to run regressions that will serve as first approximations to some of the expressions in the Domar Debt Models above. The regressions are:

LogDebt = f(logGDP) (3.1)

$(\text{LogDebt})^{-1}$ = f(logGDP) (3.1)'

Debt/GDP = f(Time) (3.2)

GDP/Debt = f(Time) (3.2)'

logDebt = f(logM2) (3.3)

$(\text{logDebt})^{-2}$ = f(logM2) (3.3)'

logGDP/Debt = f(logM2) (3.4)

logM2/GDP = f(Time) (3.5)

In regression (3.1), the objective is to determine the linear relationship between Debt and GDP. First we performed a test with the data in logs as shown in equation (3.1). This Equation (3.1) is an approximation to equations (1.1) and (2.1) in the model building section. The results of this regression are shown in the model equation, a summary of the fit of the equation, and the parameter estimates of the equation below.

Model Equation						
LOGDEBT	=	-	9.7507	+	2.4483	LOGGDP

Summary of Fit			
Mean of Response	4.6006	R-Square	0.9280
Root MSE	0.1838	Adj R-Sq	0.9228

Parameter Estimates

Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	-9.7507	1.0697	-9.1154	0.0001	.	0
LOGGDP	1	2.4483	0.1823	13.4287	0.0001	1.0000	1.0000

This equation indicated that there is strong statistical evidence that the increase in logGDP is associated with an increase in the expected value of logDebt. However, some of the assumptions of the model were violated. ***A maximum likelihood analysis suggested that the inverse transformation of logDebt is a more appropriate method than in the case of the original data.***

Based on this statistical test for appropriateness, we ran the inverse of logDebt, called logDebt1 on logGDP. The results are presented below for the model equation, the summary fit and the parameter estimates.

Model Equation					
LOGDEBT1	=	0.9203	-	0.1192	LOGGDP

Summary of Fit			
Mean of Response	0.2216	R-Square	0.9714
Root MSE	0.0055	Adj R-Sq	0.9693

Parameter Estimates							
Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	0.9203	0.0321	28.6688	0.0001	.	0
LOGGDP	1	-0.1192	0.0055	-21.7868	0.0001	1.0000	1.0000

From the test of this transformation, there is strong statistical evidence that an *increase* in logGDP is associated with a *decrease* in the expected value of **the inverse of logDebt**. No observations qualified as outliers. There was no statistical evidence that logDebt variation is dependent on the variation of logGDP. No observation qualified as influential. As a matter of completion, the probability the absolute value of T is the probability of obtaining, by chance, a t-statistic greater in absolute value than that observed, given the that the true parameter is 0. This is a two-sided p-value. A small p-value is evidence for the conclusion that the parameter is not zero. Tolerance is the dependence of the explanatory variable on the other variables. Var Inflation is the variance inflation factor of the explanatory variable.[3]

We next considered Debt/GDP over time. According to the Domar Debt model, as time approaches infinity, the Debt to GDP ratio will increase over time without limit in the first model, and a finite constant, in the second model. When we tested this type of equation, as expressed in equation (3.2) above, we obtained the results as expressed in the model equation, summary of fit and the parameter estimates below.

Model Equation					
DEBTGDP	=	0.1038	+	0.0273	TIME

Summary of Fit			
Mean of Response	0.3102	R-Square	0.7310
Root MSE	0.0835	Adj R-Sq	0.7118

Parameter Estimates							
Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	0.1038	0.0394	2.6314	0.0197	.	0
TIME	1	0.0273	0.0044	6.1685	0.0001	1.0000	1.0000

We note here that there is strong evidence that an increase in time is associated with an

[3] For additional discussion of these issues, see ***SAS/Insight, User's Guide***, Version 6, Third Edition, 1995.

increase in the expected value of the Debt/GDP ratio. However, some of the assumptions underlying the model were violated. When we looked into the explanations, it was shown that a transformation of the variable Debt/GDP would be more appropriate than the original variable. The transformation was the inverse of Debt/GDP or GDP/Debt. In this case we obtained the results below.

Model Equation					
GDPDEBT	=	5.8480	-	0.2714	TIME

Summary of Fit			
Mean of Response	3.7957	R-Square	0.9275
Root MSE	0.3824	Adj R-Sq	0.9224

Parameter Estimates

Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	5.8480	0.1807	32.3683	0.0001	.	0
TIME	1	-0.2714	0.0203	-13.3871	0.0001	1.0000	1.0000

From these results we observe that an increase in time is associated with a decrease in the expected value of the GDP/Debt ratio. This is more in line with the second model which shows that as time approaches infinity, the Debt/GDP ratio approaches some constant, in this instance, α/β. Here again, it is the inverse of the data that seem to support the Domar Debt Model. This is the model that we tested in equation in (3.2)'.

We next turned to test equation (3.3), the logDebt as a function of the log of Money Supply2 (logM2). We present the results below. Here we note, also, a strong relationship between logDebt and logM2.

Model Equation						
LOGDEBT	=	-	0.8124	+	0.9803	LOGMONEY

Summary of Fit			
Mean of Response	4.6006	R-Square	0.8810
Root MSE	0.2362	Adj R-Sq	0.8725

Parameter Estimates

Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	-0.8124	0.5349	-1.5189	0.1510	.	0
LOGMONEY	1	0.9803	0.0963	10.1826	0.0001	1.0000	1.0000

Here, too, while the above model had statistical significance, a maximum likelihood analysis suggested that an inverse square transformation of logDebt is more appropriate that the original data. However, the suggested value may not be optimal because it is at the limit of the range of the power specified.

$$(\text{logDebt})^{-2} = 0.171 - 0.022\text{logM2}$$

$R^2 = 0.969$	Root MSE = 0.003
Adj $R^2 = 0.967$	C.V. = 5.169

Variable	DF	Estimate	Std Error	T Stat	Prob>!T!	Tolerance	Var Infla
Intercept	1	0.171	0.006	29.26	0.0001	.	0
LogM2	1	-0.022	0.001	-20.84	0.0001	1.000	1.000

We next focus on the log(GDP/Debt) as a function of the logM2, as expressed in equation (3.4). From the regression we obtained the results below:

Model Equation

LGDPDEBT = 4.4219 - 0.5724 LOGMONEY

Parameter Estimates

Variable	DF	Estimate	Std Error	T Stat	Prob >|T|	Tolerance	Var Inflation
INTERCEPT	1	4.4219	0.4814	9.1854	0.0001	.	0
LOGMONEY	1	-0.5724	0.0866	-6.6061	0.0001	1.0000	1.0000

There is strong statistical evidence that an increase in logM2 is associated with a decrease in the expected value of logGDPDebt. However, there were some violations in some of the assumptions. A maximum likelihood analysis suggested that the square transformation of logGDPDebt is more appropriate than the current scale. Ultimately, we discovered, from further tests, that the strongest statistical evidence was that a quadratic form of logM2 is best associated with the expected value of $\log(GDPDebt)^2$.

The results for this test which is a take-off of equation (3.4) is

$$\text{Log}(GDPDebt)^2 = -7.493 + 5.050\log M2 - 0.604\log(M2)^2$$
$$(2.693) \qquad (-3.434)$$

$R^2 =$ 0.930

Adj $R^2 =$ 0.920

Root MSE = 0.260

C.V. = 14.73

Finally, we evaluated logM2/GDP as function of time. This notes the **impact as time approaches infinity** of an implicit Quantity Theory of Money of the usual order, MV=PQ. From the preliminary test we observed some statistical evidence that a cubic model is more appropriate than the linear model. Even though this was the best model, in terms of a fit, there were two observations which were influential in the results. This suggests that in the case of these extremes, the predictive power may be somewhat tempered. Nevertheless, the results suggest that the best fit is as follows:

$$\text{LogM2/GDP} = 0.789 + 0.386\text{Time} - 0.003(\text{Time})^2 + 0.001(\text{Time})^3$$
$$(12.500) \qquad (-5.507) \qquad (3.267)$$

$R^2 =$ 0. 992

Adj. R^2 = 0.990

Root MSE = 0.007

C.V. = 0.745

CONCLUSIONS

In conclusion, when we consider the Domar Macro debt models as specified in the mathematical models above and expounded in the regression models above, we note a few issues and we are able to draw some conclusions about Debt, GDP and Money Supply Two over the period 1983 to 1998 in the State of St. Kitts and Nevis.

First when the data are not disaggregated or when allowances are not make for violations of assumptions in the model, it appears that the Domar Debt models have built in tendencies for explosiveness. When, however, allowances are make for the violations of the models and specific adjustments are made based on the maximum likelihood analysis, we are able to offer the following conclusions:

1.0 There is a strong statistical relationship between an increase in logGDP and the expected value of logDebt.

2.0 There is stronger evidence that an increase in logGDP is associated with a decrease in the expected value of the inverse of logDebt.

3.0 There is strong evidence that an increase in time is associated with an increase in the expected value of the Debt/GDP ratio.

4.0 There is an even stronger relationship between an increase in time associated with a decrease in the expected value of the GDP/Debt ratio. **In this instance, the inverse of the Domar Debt Model is the more appropriate.** Rather than exploding, the GDP/Debt ratio tended to approach a value of 0.1038, as time approached infinity.

5.0 There is a strong relationship between logDebt and logMoney Supply Two.

6.0 Of greater significance was the fact that an inverse square transformation of logDebt relative to logM2 was a more powerful case to explain the relationship between debt and the money supply.

7.0 Finally, the log of M2/GDP is best evaluated in terms of a cubic relationship over Time. In this instance, time approaches infinity, the M2?GDP ratio approaches a constant of 0.789.

In the final analysis, what this work suggests is that the Domar Macro Debt models are useful first approximation to determine the relationships between debt, GDP and money. While the models cannot be fully replicated in their original data series form, with a deeper understanding of the underlying assumptions of the regression models, one cannot come to some conclusions of the links between the three variables in question. From such an understanding, it should be possible for policy makers to grasp the nature of planning at is pertains to debt, GDP, money and the parametric internal dynamics of these three crucial variables in small economies.

In the context of St. Kitts and Nevis, institutional factors would have to be taken into consideration to give added substance to an explanation of the relationship among the three variables.

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