



FISCAL SUSTAINABILITY ASSESSMENT FOR SURINAME 1978-2017

A FISCAL REACTION FUNCTION APPROACH

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Outline Presentation

- ▶ Introduction
- ▶ Debt in Suriname
- ▶ Fiscal Sustainability and the Fiscal Reaction Function
- ▶ Fiscal Sustainability under Uncertainty
- ▶ Data, Methodology & Results
- ▶ Key Findings



Introduction

- ▶ **Motivation:**
Government actions that would hint at unsustainable fiscal policy in the past:
 - Struggle of Governments to maintain debt levels and ceilings and
 - recent rise in debt.

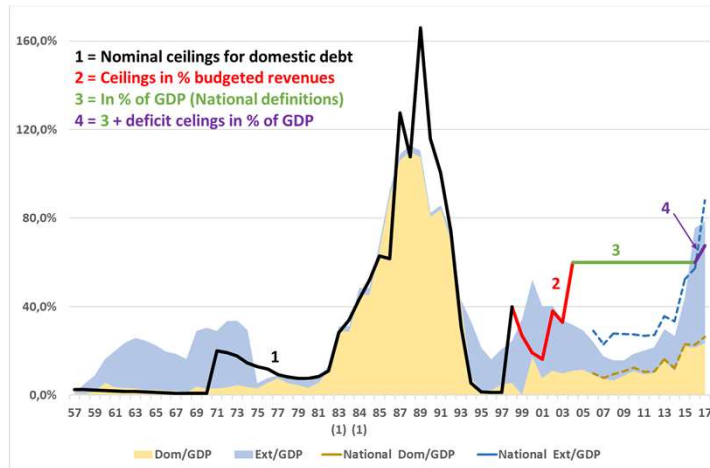
- ▶ **Objective:**
 - **“To asses if fiscal policy was sustainable during 1978-2017**

- ▶ **Approach:**
 - Fiscal Reaction Function: is employed to model fiscal behavior by analyzing the response of primary balances to debt levels.
 - OLS, VAR, TAR, VECM & GMM
 - IMF’s Debt Sustainability Analysis Framework (DSA) to address uncertainty



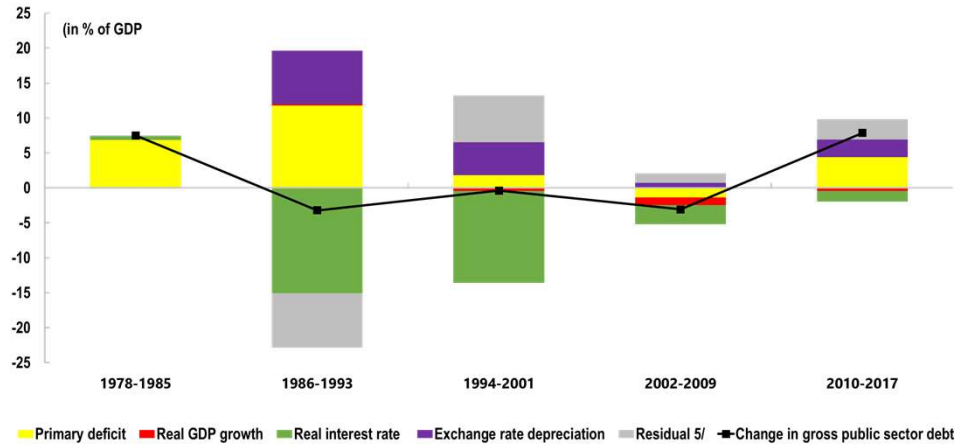
Debt in Suriname: Debt limits and Debt Levels

Struggle of Governments to maintain debt levels and ceilings.....



Debt in Suriname (cont'd): Debt-creating Flows

On average real interest rate contributed to a decrease in total debt while the primary balance and exchange rate depreciations contributed to an increase.....



Approaches to Assess Fiscal Sustainability

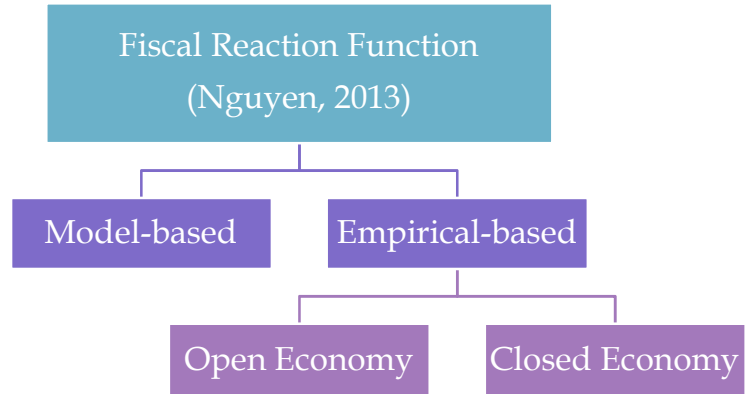
- ▶ Different approaches of fiscal sustainability assessment:
 - Accounting approach (Buiters, 1985):
 - IGBC approach (Blanchard et al., 1990)
 - Fiscal Reaction Function approach (Bohn, 1998, 2007)
 - DSGE models

- ▶ Fiscal Reaction Function Approach

Fiscal Reaction Function is a tool to model fiscal behavior by analyzing the response of the primary balance to past debt.



Fiscal Reaction Function



Fiscal Reaction Function (cont'd)

- ▶ Bohn, 1998:
 - Basic equation: $s_t = \rho d_t + \alpha \cdot Z_t + \varepsilon_t$
 - Fiscal policy is sustainable if the response coefficient in the FRF (ρ) is positive and significant. Solvency condition is met.

- ▶ Additions to Bohn's theory:
 - Sustainability requires a stronger condition: a strong enough response of primary balance to public debt;
 - Not the level of the primary balance is important but its sensitivity to a change in public debt to converge to a steady state



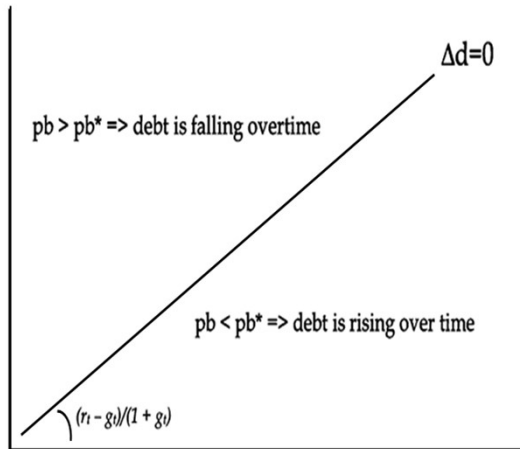
Fiscal Reaction Function (cont'd)

- ▶ Burger et al, 2007, 2011:
 - Basic equation: $(B/Y)_t^{Actual} = \alpha_1 + \alpha_2(B/Y)_{t-1}^{Actual} + \alpha_3(D/Y)_{t-1} + \varepsilon_t$
- ▶ Modifications to the basic equation:
 - $(B/Y)_t^{Required} = \alpha_t^{Required}(D/Y)_{t-1} = [(r_t - g_t)/(1 + g_t)](D/Y)_{t-1}$
 - Primary balance required to ensure a stable debt/GDP ratio
- ▶ Fiscal policy is sustainable when:
 - $\alpha_3/(1 - \alpha_2) \geq \alpha_t^{Required} = (r_t - g_t)/(1 + g_t)$



Fiscal Sustainability

$(r_t - g_t)/(1 + g_t)$: presents the slope of the line of pb's which keeps debt stable over time ($\Delta d=0$)



Strong response of pb: $(r_t - g_t)/(1 + g_t) \geq (r - g)$

Weak response of pb: $(r_t - g_t)/(1 + g_t) < (r - g)$

If: $r > g$: debt is rising

$r < g$: debt is falling

However, the case " $r < g$ " is more likely to occur in emerging market economies making the debt look sustainable.



Fiscal Sustainability under Uncertainty

- ▶ Sources of uncertainty in the case of shocks:
 - Uncertainty about interest rates (r) and growth (g) $\Rightarrow (r-g)$
 - Uncertainty about fiscal behavior (primary balance, pb)

- ▶ Stress Tests and Stochastic Simulations (fan charts)



Data, Methodology & Results

- ▶ Data:
 - Periodicity: Annual data from 1978-2017
 - Sources: Central Bank of Suriname, Ministry of Finance, Suriname Debt Management Office , General Bureau of Statistics, Planning Office, D. Djemisi (2013)
- ▶ Fiscal Reaction Function:
 - OLS, VAR & GMM for stationary data
 - Interest-Growth Differential Rule
 - Cubic OLS & TAR for Nonlinearity
 - VECM for non-stationarity
- ▶ IMF DSA Framework (Still work in progress)



Data, Methodology & Results (cont'd)

- ▶ The Fiscal Reaction Model:

$$pb_t = \beta_0 + \beta_1 pb_{t-1} + \beta_2 pb_{t-2} + \beta_3 td_{t-1} + \beta_4 X_{t(-1)} + \mu_t$$

- pb = Primary Balance
- td = Total Debt
- X = Other variables
- β = parameters
- μ = error term
- t = time



Data, Methodology & Results (cont'd)

▶ Applied Variables and Unit Root

<i>Name</i>	<i>Description</i>	<i>URT: ADF, PP & IPS</i>		<i>URT: Break point</i> <i>2001</i>
		<i>1957-2017</i>	<i>1978-2017</i>	
<i>pb</i>	<i>Primary Balance</i> / <i>GDP</i>	<i>I(0)</i>	<i>I(1)</i>	
<i>td</i>	<i>Total Debt</i> / <i>GDP</i>	<i>I(1)</i>	<i>I(1)</i>	<i>I(0)</i>
<i>cab</i>	<i>Current Account Balance</i> / <i>GDP</i>	<i>I(0)</i>	<i>I(0)</i>	
<i>g_var</i>	$\frac{\text{Expenditure}/\text{GDP}}{(\text{Expenditure}/\text{GDP})_{\text{Trend}}} - 1$	<i>I(0)</i>	<i>I(0)</i>	
<i>xch</i>	$(\text{Exchange rate}_t / \text{Exchange rate}_{t-1}) - 1$	<i>I(0)</i>	<i>I(0)</i>	
<i>NHAS</i>	<i>Dutch-Aid Dummy</i>			
<i>Elect</i>	<i>Election Dummy</i>			
<i>g</i>	$(\text{GDP}_t / \text{GDP}_{t-1}) - 1$			
<i>r</i>	$i - \pi \quad \left \quad i = \frac{\text{Government Interest Paid}_t}{\text{Total Government Debt}_t} \right.$ $\pi = \frac{\text{GDP_deflator}_t}{\text{GDP_deflator}_{t-1}} - 1$			



Data, Methodology & Results (cont'd)

► Results on Fiscal Variables

	OLS equation1	OLS equation2	OLS equation ³	GMM	TAR	VAR PB-equation
C	-0.024 <i>0.093*</i>	-0.018 <i>0.088*</i>	-0.048 <i>0.058**</i>	-0.020 <i>0.119</i>	-0.047 <i>0.004***</i>	-0.011 <i>[-0.833]</i>
pb_{t-1}	0.616 <i>0.000***</i>	0.526 <i>0.000***</i>	0.493 <i>0.000***</i>	1.346 <i>0.000***</i>	0.470 <i>0.001***</i>	0.876 <i>[4.827]</i>
pb_{t-2}	0.489 <i>0.013**</i>	0.424 <i>0.006*</i>	0.455 <i>0.003***</i>			
td_{t-1}	0.087 <i>0.058*</i>	0.062 <i>0.075*</i>	0.359 <i>0.061*</i>	0.089 <i>0.091*</i>		
(td_{t-1})²			-0.756 <i>0.058*</i>			
(td_{t-1})³			0.481 <i>0.042*</i>			
(td_{t-1})^{<0.404}					0.239 <i>0.000***</i>	



Data, Methodology & Results (cont'd)

► Results on Other Variables

	OLS equation1	OLS equation2	OLS equation ^{^3}	GMM	TAR	VAR PB-equation
cab_{t-1}		0.160	0.128			0.158
		0.020**	0.055*			[1.746]
g_var		-0.160	-0.175			
		0.000***	0.000***			
g_var_{t-1}						0.140
						[2.287]
XCH		-0.002	-0.002			
		0.008*	0.044**			
XCH_{t-1}						0.003
						[2.395]
Elect	-0.043	-0.032	-0.026		-0.027	
	0.041**	0.043**	0.089*		0.083*	
NHAS					-0.044	
					0.008***	



Data, Methodology & Results (cont'd)

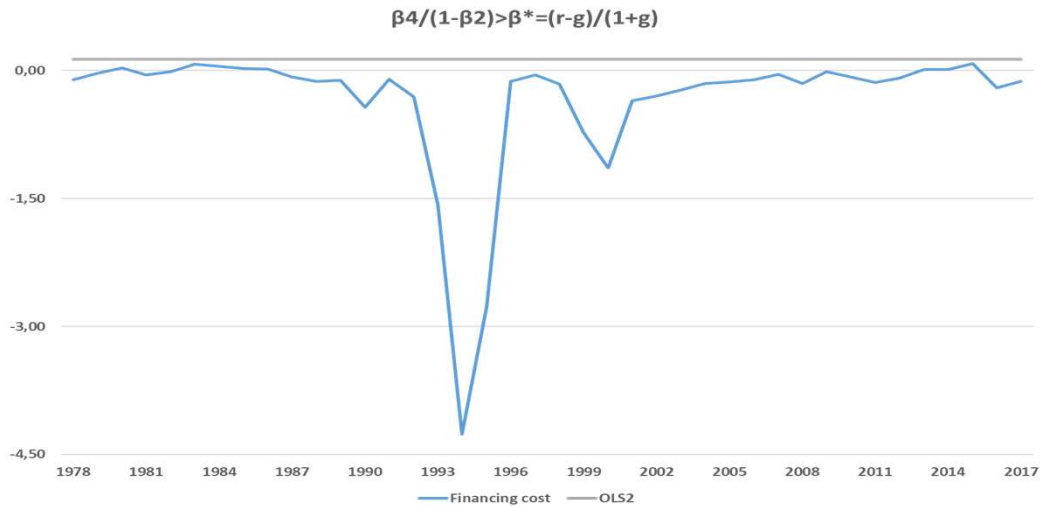
- ▶ Results on VECM
 - There is no cointegration

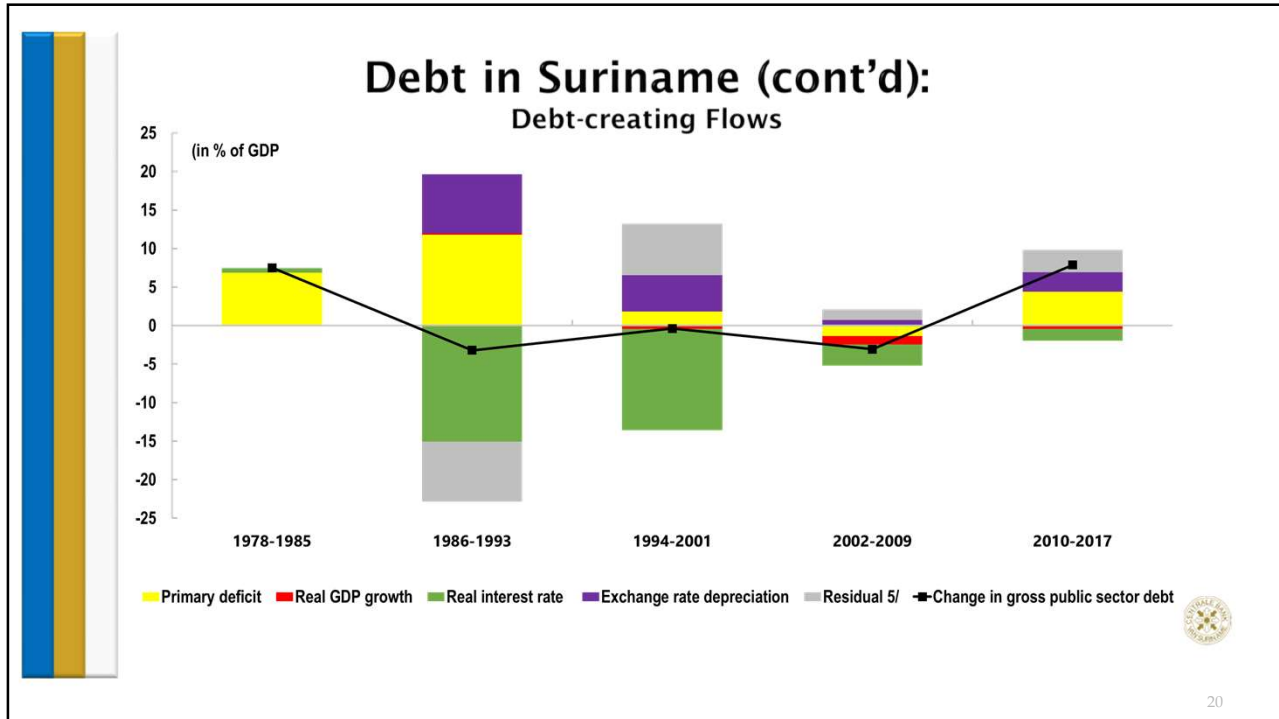
Johanson Cointegration Summary test						
(0.05 level*) Number of Cointegrating Relations by Model						
Data Trend:	None	None	Linear	Linear	Quadratic	
Test Type	No Intercept	Intercept	Intercept	Intercept	Intercept	
	No Trend	No Trend	No Trend	Trend	Trend	
Trace		2,0	1,0	2,0	1,0	2,0
Max-Eig		0,0	0,0	0,0	0,0	0,0



Data, Methodology & Results (cont'd)

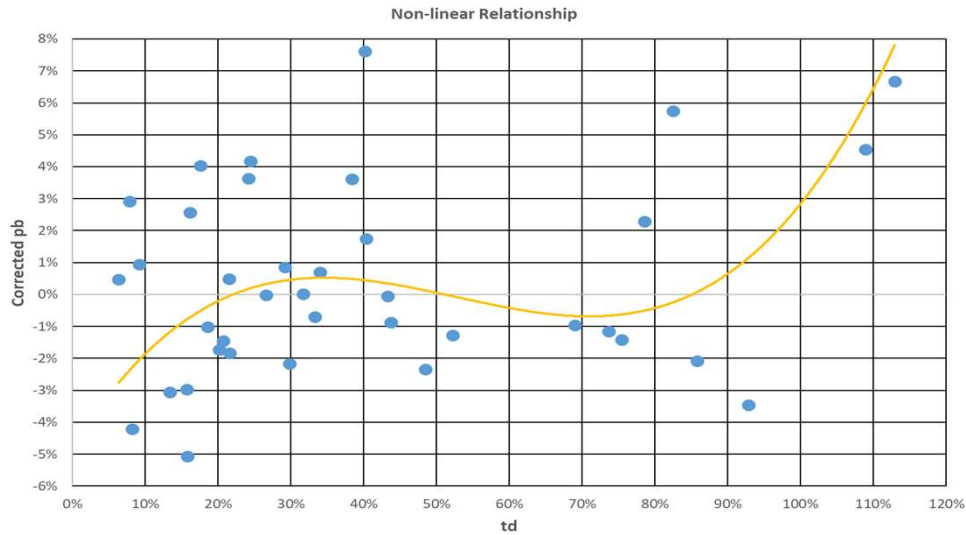
Sustainability assessment





Data, Methodology & Results (cont'd)

► Cubic_OLS



Preliminary Findings

- ▶ Inertia of the primary balance seems to last two periods back
- ▶ There seem to be:
 - A positive relationship between the primary balance and lagged debt.
 - Non-linearity between primary balance and lagged debt
- ▶ Although the interest-growth differential rule indicated a sustainable fiscal policy for Suriname, the sources contributing to that sustainability seem to mostly come from negative real interest rates and thus inflation
- ▶ Further analysis, are still a work in progress



Thank You!



Appendix

► Results on Model Specification

	OLS equation1	OLS equation2	OLS equation ^{A3}	GMM	TAR	VAR PB-equati
Adjusted R²	0,550	0,758	0,780	0,208	0,754	0,636
Durbin-Watson	1,778	1,471	1,517	2,989	1,781	N/A
Serial Correlation Tests:	-	-	-	N/A	-	-
Heteroskedasticity Test:	-	-	-	N/A	-	-
Ramsey RESET Test	-	-	-	-	-	N/A
GMM: Instruments	-	-	-	PB _{t-2} TD _{t-3}	-	-
GMM: Difference in J-stats	-	-	-	-	-	-
GMM:Cragg-Donald F-stat:	-	-	-	[7,801]	-	-
TAR: Break	-	-	-	0.404	-	-
Var: Inverse Roots	N/A	N/A	N/A	N/A	N/A	-
β4/(1-β2)-rule	0,226	0,131	0,707	-0,257	0,452	N/A

