FISCAL POLICY: FISCAL SUSTAINABILITY AND PROPOSALS FOR INSTITUTIONAL CHANGE

FISCAL SUSTAINABILITY ASSESSMENT FOR SURINAME 1978-2017. A FISCAL REACTION FUNCTION APPROACH

By Albert Mungroo and
Peggy Tjon Kie Sim-Balker

Editors:
Santiago Bazdresch
Santiago García-Verdú

2019 Joint Research Program

XXIV Meeting of the Central Bank
Researchers Network

Fiscal Sustainability Assessment for Suriname 1978-2017 A Fiscal Reaction Function Approach*

Albert Mungroo† and Peggy Tjon Kie Sim-Balker‡

Centrale Bank van Suriname

March, 2021

Abstract

High and unsustainable public debt is an economic problem at the center of many emerging and developing economies. This paper investigates, for the 1978-2017 period, how Surinamese Governments reacted to changes in public debt and assesses if fiscal policy was sustainable. Therefore, we estimate a fiscal reaction function by using the following econometric techniques OLS, VAR, TAR, GMM, and VECM. The results show a positive and statistically significant, but weak, relationship between the primary balance and total debt, indicating that governments do react to debt-increases by improving the primary balance. The exercise shows that fiscal policy is sustainable. However, we find that this was not a result of appropriate fiscal policy. While factors outside of the Government's control worsened the primary balance through declining revenues, the fiscal policy did not react swiftly by adjusting expenditures, which led to an increase in inflation.

JEL Codes: E62, H63.

Keywords: Primary Balance, Total Debt, OLS, VAR, VECM.

*This study was undertaken in the Research Department of the Central Bank of Suriname within the framework of the Center for Latin American Monetary Studies (CEMLA) Joint Research Program 2019 in collaboration with the Financial Stability and Development (FSD) Network of the Inter-American Development Bank (IDB). The authors gratefully acknowledge comments provided by Alejandro Izquierdo, Principal Economist of the Research Department of the IDB, and comments received during the internal peer review process. The authors additionally appreciates valuable comments by Karel Eckhorst and Gavin Ooft. The opinions expressed in this publication are those of the authors and do not reflect the views of CEMLA, the FSD Network, the IDB, or the Central Bank of Suriname.

†E-mail: amungroo@cbvs.sr

‡E-mail: ptjonkiesim@cbvs.sr

1 Introduction

Maintaining sustainable public debt levels remains an issue, which Surinamese policymakers constantly grapple with since the country's autonomy in 1954. Over the period 1978-2017, the calculated median debt-ratios equal 31.4 percent of GDP. The debt-data displays three distinct periods where debt exceeded the median debt ratio namely 1983-1993 with a peak of 112.9 percent, 1999-2004 with a peak of 52.2 percent and 2014-2017 with a peak of 83.7 percent. Declining revenues from commodity exports, suspension of development-aid as well as the inability to raise revenues optimally from other sectors and to cut expenditures are the most cited arguments for the widening of the primary fiscal deficit and consequently the rise in debt (Fritz-Krockow et al. 2009). Other macroeconomic variables such as exchange rate, inflation and economic growth have also affected debt-ratios.

Evident in legislation, are efforts by the Government to maintain sustainable debt levels that commenced in the fifties. Policymakers first used nominal ceilings over the period 1957-1998 to manage debt. Calculations of debt ceilings, based on budgeted revenues between 1999 and 2002, were followed by the introduction of national debt-definitions with corresponding debt-ceilings scaled against GDP. Changes in debt ceiling-methods combined with frequent changes within one-method signaled the evolution of debt in Suriname.

In light of the above, this study uses a fiscal reaction function, for the period 1978-2017, to investigate how the Surinamese government reacted to changes in public debt. Moreover, it assesses if fiscal policy was sustainable. For the estimation of this reaction function, we adopted the single-country-methodology of Burger et al. (2011) who applied different econometric techniques.

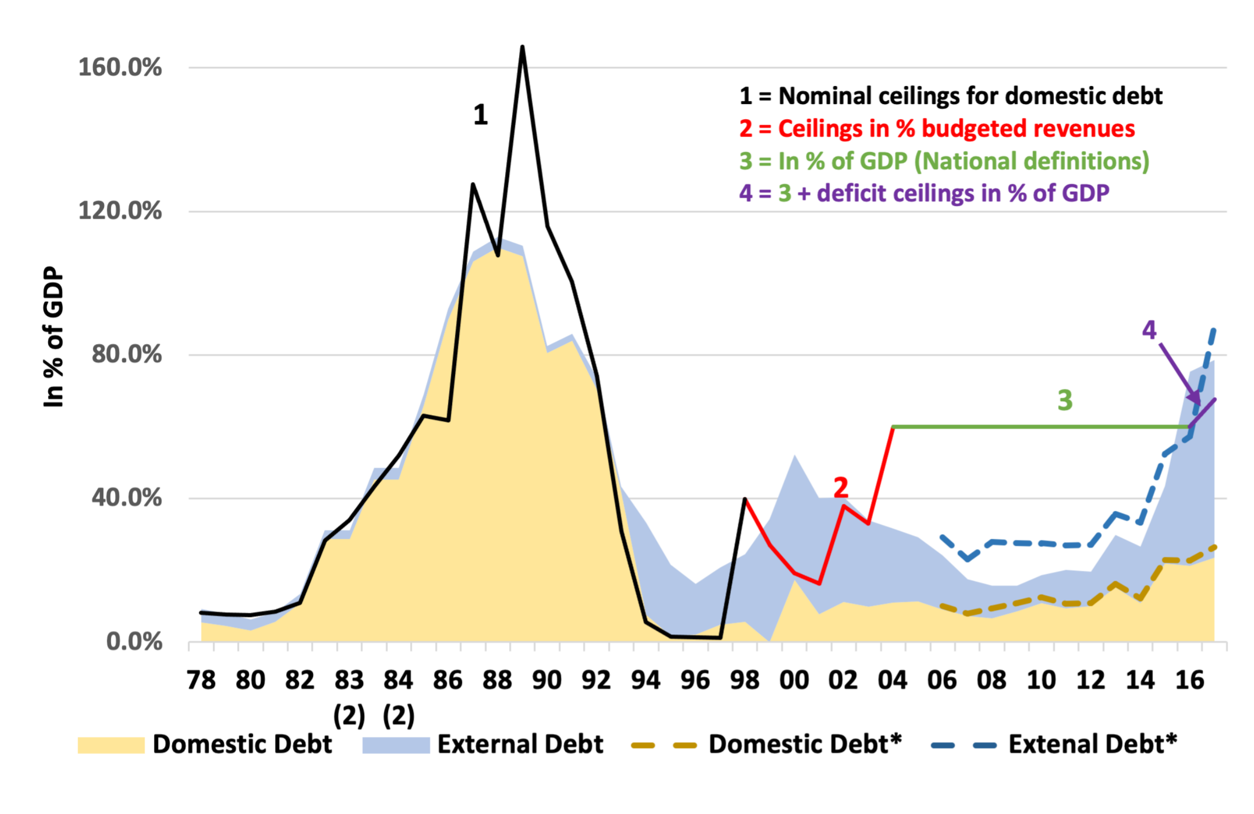
The remainder of the paper is organized as follows. The next section provides a brief overview of the evolution and institutional framework of government debt. The third section reviews the literature and theory regarding fiscal sustainability and the reaction function. Thereafter, section four outlines the methodology and discusses the results of our empirical analysis. The fifth section presents our main conclusion and recommendations.

2 Evolution of Government Debt in Suriname over 1978-2017

Consecutive administrations have struggled to contain its public debt, taking into account the evolution of total debt and its ceilings (Figure 1). While median debt stands at 31 percent of GDP, three episodes of debt exceeded that median, namely 1983-1993, 1999-2004 and 2014-2017. In 1983-1993, debt peaked at 112.9 percent of GDP, mostly consisting of domestic debt while the other episodes had smaller peaks consisting largely of external debt.

By imposing ceilings, Governments' intention to contain debt is evident. From 1978 to 1998, the legislature imposed nominal ceilings on domestic debt, in accordance with a Public-Loans Act. The nominal ceilings were adjusted 10 times during this period because of breaches of the ceilings and limited debt-space. The second period, 1998-2001, consisted of an adjustment of the Public-Loans Act whereby maximum public-debt levels were set as a ratio of projected current revenues (Dorinnie et al. 2017). In this period, the Government established a commission to report on the amount of outstanding debt due to poor recording of debt over the period 1996-2000 (Atmodimedjo (2002); Roseval et al. (2001)). The report's recommendation led to the adoption of a Public Debt Act and the founding of Suriname Debt Management Office.

Figure 1: Government Debt and -Ceilings[1]



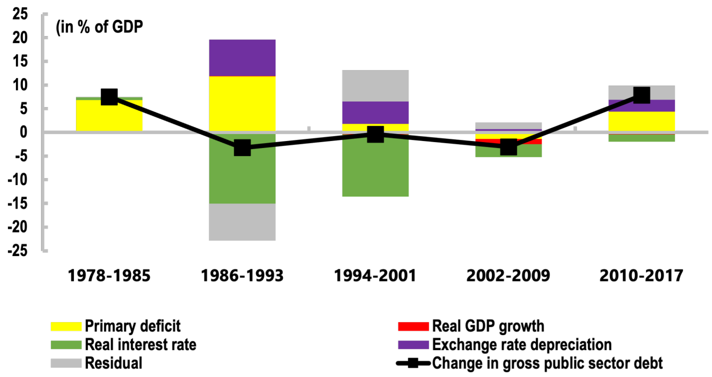
Notes: This graph depicts the evolution of debt and its ceilings. The different types of ceilings that were applied and the changes within each ceiling. (2) Denotes a second adjustment of the ceilings in 1983 and 1984. Source: Central Bank of Suriname and Suriname Debt Management Office.

[1]The Public Debt Act was enacted in 2002 but data recording based on this Act started in 2004.

In the last period, 2002-2017, total, external and domestic public-debt levels were governed by ceilings set as a ratio-to-GDP. As in previous periods, both ceilings and debt definitions went through several adjustments in this period. In 2017, Parliament allowed a breach of the ceiling, because of a recession in 2015-2016 that was deemed as special circumstances where real and nominal GDP declined in combination with severe exchange rate volatility. The most recent amendment of the Public Debt Act stipulates the length and size of the breach, based on a ceiling for overall deficits scaled against GDP (Dorinnie et al. 2017).

The efforts of the Government to contain debt are less apparent when reviewing the debt creating flows over the period 1978-2017 (Figure 2). High inflation levels as the driver of negative real interest rates contributed to the decline of total debt. The primary balance was driving debt over the period 1978-1993. Policymakers managed to reduce this balance in the period 1994-2001 and 2002-2009, still this period was not free from fiscal distress, especially between 1996-1999 which led to a sizeable devaluation and thus to a sharp increase in external debt. In the last period, the primary balance is again the main contributor to the rise in debt. Declining commodity exports and the slow pace of expenditure rationalization worsened primary balances (Mungroo & Tjon Kie Sim-Balker 2016).

Figure 2: Evolution of Total Debt



Notes: The evolution of the debt-to-GDP ratio is depicted in relation to the debt-creating flows. A bar above the zero-line indicates flows causing a rise in the debt-ratio while a bar below indicates a flow causing a decline in the debt ratio. Source: Central Bank of Suriname, National Bureau of Statistics, Suriname Debt Management Office and author's elaboration.

3 Fiscal Sustainability and the Fiscal Reaction Function

In the past, public debt developments have led to sharp fiscal adjustments and crises (a failure of economic agents to meet their obligation), which gave rise to the concept of fiscal sustainability (Asiama et al. 2014). This concept evolved overtime from the Accounting Approach of Buiter (1985) and on-ward. The concept evolved into a more general definition of fiscal sustainability, which is explained as "the present value of future primary surpluses is equal to or greater than the current level of debt" (Asiama et al. 2014). The use of primary rather than total balances is justified because the intertemporal government budget constraint (IGBC) relates to the primary surplus. The use of the primary balance is consistent since primary expenditure is more easily under the discretionary control of the government (Afonso & Hauptmeier 2009).

Some authors distinguish between solvency and sustainability. If the government is capable, over an infinite horizon, of paying its debt via future primary surpluses then it is solvent. The concept of solvency comes from the IGBC approach from Blanchard (1990). This differs from sustainability, which is the ability of the government, under current policies, to achieve a pre-specified debt-to-GDP ratio in a finite time horizon. Current policies indicate policy without making large adjustments to reach debt objectives (Asiama et al. 2014). These policies a priori rule out inflating debt away, selling government assets and debt defaults (Daniel et al. 2003).

Bohn (1998) however stated that the IGBC approach is only true under certain conditions and therefore proposes to use a fiscal reaction function to estimate solvency. He derived the fiscal reaction function from the IGBC and used it as a tool to model fiscal behavior by analyzing the response of the primary balance to past debt. Bohn's basic equation has the form[2]: $s_t = \rho d_t + \alpha \dot{Z}_t + \epsilon_t$ from which he said that fiscal policy is solvent if the response coefficient in the fiscal reaction function (ρ) is positive and significant. After Bohn, many more studies such as De Mello (2008), Burger et al. (2011) and Mendoza & Ostry (2008) used fiscal reaction functions. Additions to Bohn's theory are that sustainability requires a stronger condition such as a strong enough response of the primary balance to changes in public debt instead of the level of the primary balance. Important is the sensitivity of the primary balance to a change in public debt to converge to a steady state after a shock.

Starting with the Intertemporal Government Budget Constraint (IGBC), expressed by equation (1), we derive the following fiscal reaction function:

$$TD_t = TD_{t-1} + iTD_{t-1} - PB_t, \tag{1}$$

where TD_t is the stock of government debt, i the nominal interest rate on government debt and PB_t the primary balance.

From the IGBC, the change in government's debt–to-GDP ratio is estimated as:

[2] Where s_t = primary surplus to GDP, d_t = Debt-to-GDP ratio, Z_t = a set of other determinants of the primary surplus, and ϵ_t = error term.

$$\Delta\left(\frac{TD}{Y}\right)_t = \frac{(r-g)}{(1+g)}\left(\frac{TD}{Y}\right)_{t-1} - \left(\frac{PB}{Y}\right)_t, \tag{2}$$

where r is the real interest rate, g the real economic growth and Y the nominal GDP. If lower case letters are used to represent ratios to GDP, equation (2) becomes:

$$\Delta(td)_t = \left(\frac{(r-g)}{(1+g)}\right)(td)_{t-1} - (pb)_t. \tag{2.1}$$

Assuming that $\Delta(td)_t$ is zero then from equation (2.1) one can estimate the primary balance which is required for the debt/GDP ratio to remain stable:

$$(pb)_t = \left(\frac{(r-g)}{(1+g)}\right)(td)_{t-1}. \tag{3}$$

If β^* represents $\left(\frac{(r-g)}{(1+g)}\right)$, equation (3) becomes the "fiscal reaction function" for the government:

$$(pb)_t = \beta^*(td)_{t-1} + \epsilon_t. \tag{4}$$

In his study for Brazil, De Mello (2008) included an AR(1) term for the primary balance, $(pb)_{t-1}$, on the right-hand side of equation (4) to allow for inertia in government's behavior. Following Bohn (1998), De Mello (2008), Doi et al. (2011), Burger et al. (2011), and Nguyen (2013) also added the output gap, y_gap, to capture the impact of the business cycle on the budget. The fiscal reaction function to be estimated is then specified as:

$$(pb)_t = \beta_1 + \beta_2(pb)_{t-1} + \beta_3(td)_{t-1} + \beta_4(y\_gap)_t + \epsilon_t. \tag{5}$$

To determine if the government does react to the level of its debt-to-GDP ratio the parameter β_3 has to be positive and significant. However, for fiscal policy to be sustainable the following condition must be met:

$$\frac{\beta_3}{(1-\beta_2)} > \beta^* = \frac{(r-g)}{(1+g)}.$$

4 Data and Methodology

The reaction of the Surinamese Government to its debt burden is measured by utilizing a fiscal reaction function based on the methodology of Burger et al. (2011). Concomitantly, this section addresses the discussion on stationarity of the data by assuming three data- and model-properties.

All employed models aim at utilizing equation (5) in section three or a derivation of that equation. An OLS, GMM, and VAR address the possibility of stationary data. The VAR can also capture multiple interactions between the variables while the GMM addresses concerns regarding correlation of explanatory variables and the error term due to non-linearity, measurement error or simultaneity. The instrument variables in the GMM are the lags of the explanatory variables. Under the assumptions of possible non-linear behavior, a cubic OLS and two TAR models are utilized. The first TAR model captures a break in Government's behavior due to a certain debt level – so-called "high" and "low" debt – (Abiad & Ostry 2005) while the second model takes into account behavioral changes regarding a negative or positive output gap. Lastly, in the case of non-stationarity a Vector Error-Correction approach (VECM) is used.

In order to execute the adopted approach, data for three variables were collected namely, the primary balance (PB), total debt (TD)[3] and the output gap (y_gap). The PB- and TD-data were scaled against nominal GDP therefore for the remainder of the paper they are referred to as lowercase letters *pb* and *td*. y_gap was calculated as:

$$y\_gap = \left[\frac{y\_act}{y\_pot} - 1\right] \times 100\%, \tag{6}$$

where y_act and y_pot respectively represent the real-GDP-observed-values an the real-GDP-trend which was generated by the HP-filter ($\lambda : 100$). The annual data set ranges from 1978 to 2017 and the data was entered as a fraction into Eviews (Appendix Table A.1). All econometric tests and procedures were performed using Eviews 10 software package.

4.1 Unit Root and Co-integration Tests

The unit root test is conducted to determine the order of integration for each series. Therefore, in this study, the individual root of ADF, PP and IPS of the group-unit-root tests[4] are utilized for the variables *pb*, *td* and y_gap over two different time periods namely 1960-2017 & 1978-2017 to see if the results from various tests reveal a consistent pattern.

The ADF, PP and IPS unit-root test results over the period 1960-2017 suggest that the variables *pb* and y_gap are stationary in level while *td* is stationary in first difference (Table 1). For the period 1978-2017, only y_gap is stationary in levels while *pb* and *td* are stationary in first difference.

For the two time-periods, *pb* shows opposing results while *td* has almost uniform results having a unit root in levels. Two outcomes, ir-ADF-intercept and ir-IPS-intercept, for the period 1978-2017 show that *td* is stationary in levels. Burger et al. (2011) argue that all unit root tests have weaknesses in determining the stationarity for each series. Therefore, several models will be utilized to not only capture non- vs stationarity, but issues regarding simultaneity, non-linearity and complex behavior among variables will

[3]The data-point for 1999 is missing and is linearly interpolated using EViews 10.

[4]The null-hypothesis of all these tests read: "Unit root (individual unit root process)".

also be captured.

Table 1: Group-Unit-Root Tests

Variable	Test-level	ir ADF			ir PP			ir IPS	
1960-2017	Rank of stability	Intercept Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept
pb	l(0)	0.003***	0.015**	0.001***	0.004***	0.020**	0.001***	0.003***	0.015**
td	l(0)	0.136	0.323	0.246	0.245	0.492	0.327	0.136	0.323
y_gap	l(0)	0.000***	0.000***	0.000***	0.023**	0.097*	0.002***	0.000***	0.000***
td	l(0)	0.001***	0.004***	0.000***	0.001***	0.003***	0.001***	0.001***	0.004***
1978-2017	Rank of stability	Intercept Intercept	Trend & Intercept	None	Intercept	Trend & Intercept	None	Intercept	Trend & Intercept
pb	l(0)	0.095*	0.227	0.157	0.133	0.227	0.034**	0.095*	0.227
td	l(0)	0.013**	0.418	0.304	0.320	0.629	0.398	0.013**	0.418
y_gap	l(0)	0.002***	0.008***	0.000***	0.034	0.088*	0.002***	0.002***	0.008***
pb	l(1)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
td	l(1)	0.013**	0.059*	0.001***	0.011**	0.048**	0.001***	0.013**	0.059*

Notes: The results of the different unit root tests are presented. For all data series that are not stationary in level [I(0)], the test is repeated in first difference [I(1)]. The primary balance is *pb*, total debt is *td* and the output gap is *y_gap*. p-value: 10 percent -*, 5 percent -**, 1 percent - *** rejection of the null-hypothesis. I(0): stationary at levels, I(1): stationary in first difference. Source: Authors' elaboration.

4.2 Estimation Results: OLS, TAR, VAR and GMM Models

In view of capturing non- vs stationarity, simultaneity, non-linearity and complex behavior among variables, the results from various estimation techniques are reported. The estimation results, presented in Table 2, refer to the period 1978-2017 for the OLS-, Cubic-OLS, GMM-, two TAR and VAR-equation. All the regressions include an output gap and several dummy variables. The crisis-dummy – 1983, 1986, 1991, 1993 and 2000 representing economic downturns – and recovery-dummy – 1994 and 2001 marking periods of strong recovery – captured severe volatility in the data for the OLS, the TAR and the VAR-models. The GMM-model did not require the use of dummies while the Cubic-OLS seemed to capture most of the volatility except for 2000 and 2001. The TAR-analysis regarding a positive or negative output-gap required an additional dummy for 2016.

Table 2: Fiscal Reaction Functions for Suriname

Variables	OLS	OLS^3	GMM	TAR_TD-break 40.3 percent	TAR_y_gap	VAR PB-equation
C	[rgb] .851, .882, .949 -0.027 [rgb] .851, .882, .949 (0,004)***	[rgb] .851, .882, .949 -0.079 [rgb] .851, .882, .949 (0,032)**		[rgb] .851, .882, .949 -0.050 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 -0.014 [rgb] .851, .882, .949 (0,099)*	[rgb] .851, .882, .949 -0.025 [rgb] .851, .882, .949 [-3,05551]
PB_{t-1}	[rgb] .851, .882, .949 0.858 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 0.754 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 1.346 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 0.776 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 0.843 [rgb] .851, .882, .949 (0,000)***	[rgb] .851, .882, .949 0.870 [rgb] .851, .882, .949 [9,51226]
TD_{t-1}	[rgb] .851, .882, .949 0.053 [rgb] .851, .882, .949 (0,028)**	[rgb] .851, .882, .949 0.530 [rgb] .851, .882, .949 (0,045)**	[rgb] .851, .882, .949 0.089 [rgb] .851, .882, .949 (0,091)*			[rgb] .851, .882, .949 0.056 [rgb] .851, .882, .949 [2,61376]
TD^2_{t-1}		[rgb] .851, .882, .949 -1.110 [rgb] .851, .882, .949 (0,032)**				
TD^3_{t-1}		[rgb] .851, .882, .949 0.642 [rgb] .851, .882, .949 (0,028)**				
TD_low_{t-1}				[rgb] .851, .882, .949 0.199 [rgb] .851, .882, .949 (0,000)***		
TD_high_{t-1}				[rgb] .851, .882, .949 0.063 [rgb] .851, .882, .949 (0,002)***		
TD_posgap_{t-1}					[rgb] .851, .882, .949 0.047 [rgb] .851, .882, .949 (0,012)**	

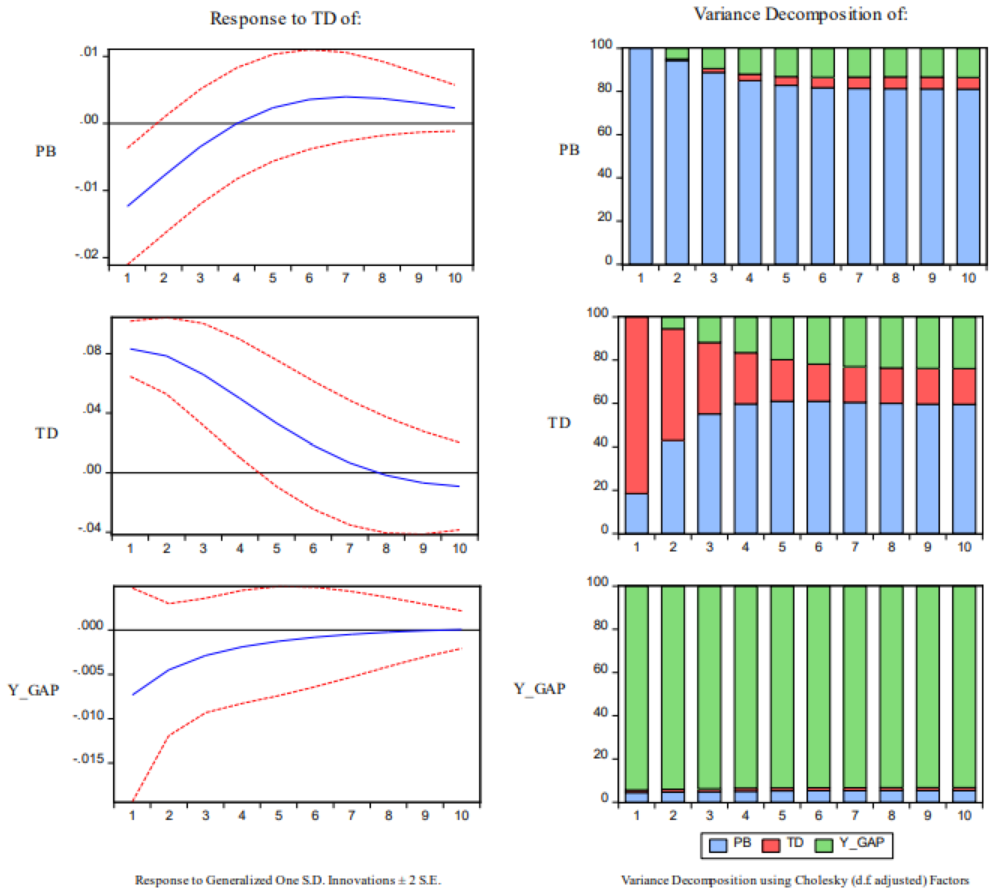
Notes: This table provides an overview of the results of the relationship between the primary balance and total debt under the different equations. The primary balance is *pb*, total debt is *td* and the output gap is *y_gap*. Standard errors in ( ) & t-statistics in [ ]; light blue depicts t-values greater than ±1.65 for 10 percent probability. P-value: *10 percent, **5 percent, ***1 percent. Source: Author's elaboration.

In all the regressions the parameter for all forms of lagged debt ($(td)_{t-1}$) is statistically significant at a 5 percent level, except in the GMM, which is significant at a 10 percent level, indicating the Government takes into account past debt-to-GDP-levels. All are positive, but with a small impact as the parameters ranged from 0.05 to 0.20 percent except for the Cubic-OLS. The results seem most evident in the period 1994-2005 where Governments managed to reduce primary deficits and even created surpluses (Figure 2). The output-gap-parameters (including VAR-lagged) are statistically significant in most models and are always positive, indicating some type of countercyclical behavior by the Government. However, inertia seems very persistent with large – significant at 1 percent-level and above 0.75 percent – lagged primary-balance-parameters. Seemingly, inertia overpowers the Government's counter-cyclical behavior and their ability to stabilize debt. The effects of inertia seem evident in the period 1978-1993 and 2010-2017. In these periods, primary deficits seemed persistent (Figure 2).

The two TAR models present differences in government's reaction to different levels of debt and different business-cycle-stages. The different debt levels were determined with the Bai-Perron tests taking into account one threshold. The threshold model selected a break at 40.3 percent whereby debt-levels smaller than the break are specified as low-debt and levels equal or larger than the break are specified as high-debt. This TAR showed a diminished reaction of the government to debt-levels when these levels transition from low- to high-debt. Where the output gap serves as transition variable, the threshold was set at zero. This TAR-model produced an insignificant result for government's reaction to debt-levels in busts while in booms the fiscal reaction to debt levels was significant.

From the VAR-model (Appendix: Table A.2 & A.3 and Figure A1), the impulse responses (Figure 3, LHS) and the variance decomposition (RHS) showed that the duration and the impact of *td* on *pb* is short and small. An initial shock of *td* negatively influences *pb*, where after this variable corrects upward but only the first period seems statistically significant. In addition, the variance of *pb* explained by *td* is non-existent in the first period and seem to increase to almost 5 percent in the eight period. Most of the variance of *pb* is explained by itself.

Figure 3: Impulse Response and Variance Decomposition



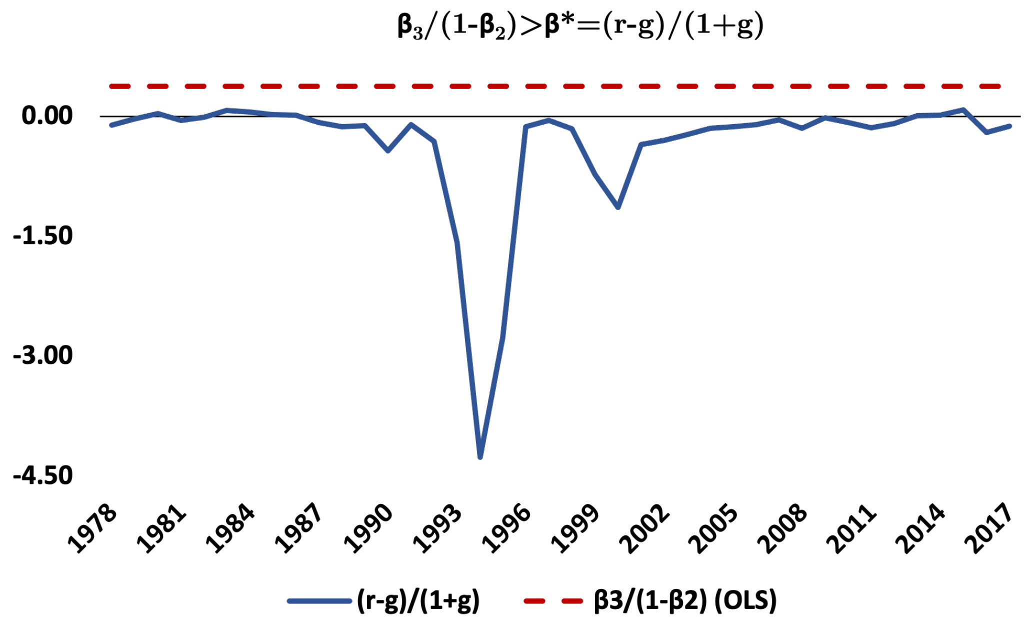
Notes: This graph shows the impulse responses and the variance decomposition of *pb* with regard to *pb*, *td* and *y_gap*. The duration and impact of the different variables on *pb* are depicted. Source: Author's elaboration.

All models well-behaved (Appendix Table A.4) except for the GMM-specific-tests indicated that indicates the explanatory variables are exogenous and the instruments are weak refuting the notion of non-linearity. In addition, the cubic-OLS did suffer from multi-collinearity according to the variance inflation factors. For the VAR, one lag was selected as suggested by the Schwarz- and the Hannan-Quinn information criterion. The VECM-approach did not render any useful results. The Johansen Co-integration Summary Test and the Max-Eigen Value showed that there are no co-integration relationships among *pb*, *td* and *y_gap*.

4.3 Sustainability Exercise

As explained in section three, fiscal policy will be sustainable if $\frac{\beta_3}{(1-\beta_2)} > \beta^* = \frac{(r-g)}{(1+g)}$. Figure 4 presents an empirical estimate of $\frac{(r-g)}{(1+g)}$ and $\frac{\beta_3}{(1-\beta_2)}$ from the OLS-equation[5]. For the OLS as well as the other modelsFor the OLS as well as the other models[6], $\frac{\beta_3}{(1-\beta_2)}$ is greater than $\beta^* = \frac{(r-g)}{(1+g)}$

Figure 4: Sustainability Exercise



Notes: This graph shows the sustainability condition for Suriname using OLS-equation. Source: Author's elaboration.

In the last period, 2010-2017, the exchange rate has been a factor in explaining the increase in debt. Currently the exchange rate has been under pressure again for quite some time. A possible depreciation can lead to a further increase in debt. Also, large shocks or sustained periods of negative growth can negatively impact on the debt trajectory. These episodes can cause debt levels to rise or high debt levels to persist. Commodity price volatility usually influences production of price-taking commodity exporters therefore; sluggish prices can suppress growth in these economies.

5 Conclusions and Recommendations

Over the research period, policymakers did react to debt-increases by improving the primary balance. This is derived from the estimated fiscal reaction function for Suriname

[5]The effective interest rate was calculated by dividing total interest payments divided by total debt. This is as the weighted average of the rates on the various outstanding debt instruments in Suriname.

[6]Except for the GMM-model.

showing a significant and positive relationship between the primary balance and total debt. From 1994-2001 there were clear efforts by policymakers to consolidate the primary balance, still between 1996-1999 fiscal distress led to a sizeable devaluation and thus to a sharp increase in external debt. In addition, the sustainability exercise also showed that fiscal policy seems to be sustainable. However, the exercise shows that negative real interest rates attributed to this sustainability rather than appropriate fiscal policy. While factors outside of the government's control worsened the primary balance trough declining revenues, fiscal policy did not react swiftly by reducing expenditures, which lead to increases inflation, affecting real interest rates, thus stabilizing debt in an unfavorable manner.

The inability of the government to reduce its primary balance is also evident in the fiscal reaction function as inertia is very significant and sizable in the results. While Governments did improve their primary balance over the period 1994-2005, it took 8 years to do so. Seemingly, inertia overpowers the Government's counter-cyclical behavior and their ability to stabilize debt.

From the above we recommend that first, the Government embark on a path to improve the fiscal position and discipline. Secondly, taking the other risks into account the Government should favor concessional loans to avoid high nominal interest rates or inflation indexed debt instruments. Thirdly, close coordination between the Ministry of Finance and the Central Bank is pivotal to manage exchange rate pressures to avoid large depreciations, which has negative effects on foreign-currency-denominated debt. Since exchange rate pass-through is large, high inflation only erodes local-currency-denominated debt while exerting pressure on domestic income.

Fourth, the Government should implement policies aimed at stimulating economic activity. The most sustainable way is to implement a structural reform of the economy aimed at reducing Government involvement in the economy and promoting private initiative. This increases Government's revenue base, lower expenditures and therefore improves the primary balance. Fifth, to mitigate the risk of volatile commodity prices the Government established a Savings and Stabilization Fund with stringent fiscal rules to accompany the Fund's operations. All branches of the Government should safeguard these rules making them unsusceptible to political and personal influences. Furthermore, a revenue-forecasting unit is preferable to be able to forecast realistic levels of (commodity) revenues.

Sixth, the establishment of a Risk Unit within the Ministry of Finance that deals with the identification and quantification of risks in various areas, mainly long-term risks associated with for example social spending is very important. These long-term risks can put large pressure on spending in the future. Lastly, to understand the dynamics behind inertia of past fiscal policy and the rules needed to combat this inertia, future research is inevitable. Therefore, this study is not exhaustive but rather a steppingstone

References

Abbas, S. A., Akitoby, M. B., Andritzky, M. J. R., Berger, M. H., Komatsuzaki, M. T. & Tyson, J. (2013), Dealing with High Debt in an Era of Low Growth, IMF Staff Discussion Note SDN/13/07.

Abiad, A. & Ostry, J. D. (2005), Primary Surpluses and Sustainable Debt Levels in Emerging Market Countries, IMF Policy Discussion Papers.

Afonso, A. & Hauptmeier, S. (2009), Fiscal Behaviour in the European Union: Rules, Fiscal Decentralization and Government Indebtedness, ECB Working Paper Series 1054.

Asiama, J., Akosah, N. & Owusu-Afriyie, E. (2014), An Assessment of Fiscal Sustainability in Ghana, Bank of Ghana Research Working Paper WP/BOG-2014/09. Accra, Ghana: Bank of Ghana.

Atmodimedjo, E. (2002), Inleiding Wet Staatsschuld, Technical Report 5, Paramaribo, Suriname: Centrale Bank van Suriname.

Blanchard, O. J. (1990), Suggestions for a New Set of Fiscal Indicators, OECD Economics Department Working Paper 79, Paris, France: OECD Publishing.

Bohn, H. (1998), 'The Behavior of U.S. Public Debt and Deficits', *the Quarterly Journal of Economics* **113**(3), 949–963.

Buiter, W. H. (1985), 'A Guide to Public Sector Debt and Deficits', *Economic Policy* **1**(1), 13–61.

Burger, P., Stuart, I., Jooste, C. & Cuevas, A. (2011), Fiscal Sustainability and the Fiscal Reaction Function for South Africa, IMF Working Paper WP/11/69, Washington, DC, United States: International Monetary Fund.

Daniel, J., Callen, T., Terrones, M. E., Debrun, X. & Allard, C. (2003), 'Public Debt in Emerging Markets: Is it Too High?', *World Economic Outlook* p. 113.

De Mello, L. (2008), 'Estimating a Fiscal Reaction Function: The Case of Debt Sustainability in Brazil', *Applied Economics* **40**(3), 271–284.

Doi, T., Hoshi, T. & Okimoto, T. (2011), 'Japanese Government Debt and Sustainability of fiscal policy', *Journal of the Japanese and International Economies* **25**(4), 414–433.

Dorinnie, H., Mungroo, A. W. & Tjon Kie Sim-Balker, P. R. M. (2017), 'Fiscale Wetgeving in Suriname - Ontwikkeling en Structuur van 1954 tot en met 2016', *Mimeo* .

Fritz-Krockow, B., El-Masry, G. Z., Nozaki, M., Roy, T., Portillo, R. A., Torres, M. & Dyczewski, P. (2009), 'Suriname: Toward Stability and Growth', *Departmental Papers* **2009**(003), A001.
URL: *https://www.elibrary.imf.org/view/journals/087/2009/003/article-A001-en.xml*

Mendoza, E. G. & Ostry, J. D. (2008), 'International Evidence on Fiscal Solvency: Is Fiscal Policy "Responsible"?', *Journal of Monetary Economics* **55**(6), 1081–1093.

Mungroo, A. W. & Tjon Kie Sim-Balker, P. R. M. (2016), 'Determining a Debt Threshold for Suriname', *Mimeo* .

Nguyen, T. (2013), 'Estimating India's Fiscal Reaction Function', *Australia South Asia Research Centre Working Paper* (2013-05).

Roseval, R., Philips van, T. L. M., Brahim, A. & Holtmaat, J. W. (2001), Rapport van de Commisie Inventarisatie Staatsschuld.

Appendix

Table A.1: Model Variables and Data

Year	Primary Balance scaled to GDP	Total Debt scaled to GDP	Output Gap	Inflation	Interest Rate	Growth rate
t	pb	TD	Y_GAP	\pi	i	g
1978	-0,01	0,09	0,14	0,02	0,02	0,013
1979	0,02	0,08	0,1	0,09	0,04	-0,03
1980	0,02	0,06	-0,01	0,11	0,06	-0,09
1981	-0,03	0,08	0,06	0,04	0,06	0,07
1982	-0,05	0,13	0,01	0,07	0,02	-0,04
1983	-0,16	0,31	-0,03	0.00	0,04	-0,04
1984	-0,15	0,48	-0,04	0.00	0,03	-0,02
1985	-0,18	0,69	-0,02	-0,01	0,03	0,02
1986	-0,22	0,93	-0,01	0,01	0,04	0,01
1987	-0,2	1,09	-0,07	0,17	0,04	-0,06
1988	-0,17	1,13	0,01	0,1	0,04	0,08
1989	-0,08	1,1	0,05	0,12	0,04	0,04
1990	-0,02	0,82	0,01	0,5	0,04	-0,04
1991	-0,1	0,86	0,03	0,12	0,04	0,03
1992	-0,04	0,74	0,04	0,35	0,04	0.00
1993	-0,12	0,43	-0,03	1,57	0,03	-0,07
1994	0,01	0,33	-0,01	4,38	0,01	0.00
1995	0,03	0,21	-0,02	2,77	0.00	0.00
1996	0,01	0,16	-0,02	0,12	0.00	0,01
1997	-0,03	0,21	0,02	0,01	0,02	0,06
1998	-0,12	0,24	0,02	0,17	0,03	0,02
1999	0,04	0,38	-0,03	0,74	0,01	-0,01
2000	-0,03	0,52	-0,04	1,15	0,01	0,02
2001	0,03	0,4	-0,04	0,36	0,03	0,04
2002	-0,01	0,4	-0,05	0,32	0,05	0,03
2003	0,01	0,34	-0,04	0,22	0,05	0,06
2004	0,03	0,32	0.00	0,12	0,04	0,08
2005	0,07	0,29	-0,01	0,14	0,05	0,05
2006	0,02	0,24	0.00	0,12	0,06	0,06
2007	-0,01	0,18	0,01	0,06	0,07	0,08
2008	-0,02	0,16	0,01	0,16	0,04	0,05
2009	-0,04	0,16	0.00	0,06	0,08	0,06
2010	-0,02	0,19	0,02	0,07	0,05	0,05
2011	-0,01	0,2	0,05	0,14	0,05	0,04
2012	-0,02	0,22	0,05	0,11	0,04	0,03
2013	-0,04	0,3	0,06	0.00	0,04	0,03
2014	-0,02	0,27	0,05	0,02	0,03	0.00
2015	-0,09	0,44	0.00	-0,02	0,03	-0,03
2016	-0,08	0,75	-0,07	0,28	0,03	-0,05
2017	-0,07	0,79	-0,06	0,15	0,04	0,02

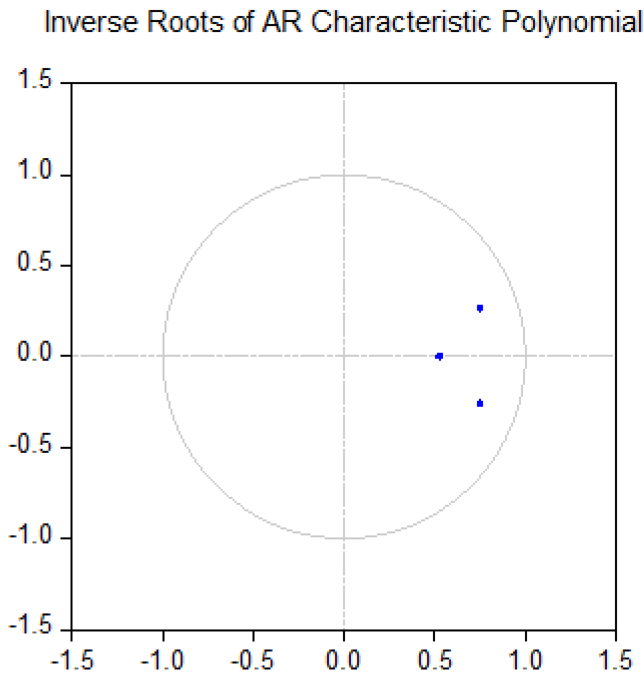
Notes: Data collected over the research period under consideration in this paper. Source: Central Bank of Suriname, National Bureau of Statistics, Suriname Debt Management Office.

Table A.2: VAR Lag Length Critieria

VAR Lag Order Selection Criteria Endogenous variables: *pb*, *td* and *y_gap*						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	1242456	NA	4.67E-07	-6062323	-5935657	-6016524
1	1872446	1133967*	3.15E-08	-8762232	-8255568*	-8579038*
2	1973185	1662192	3.01E-08*	-8815927*	-7929265	-8495338
3	2016426	6486067	3.89E-08	-8582129	-7315469	-8124145

Notes: The results of the lag length criteria for the VAR estimates under Table (3.A) in the Appendix. * indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5 percent level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion. Source: Author's elaboration

Figure A1: Inverse Roots of AR Characteristic Polynomial



Notes: This graph shows the results of stability of the VAR in Table (3.A) in the Appendix. If the VAR is stable, the inferences of impulse response functions and variances decomposition are valid. Source: Author's elaboration.

Table A.3: VAR Estimates

	PB	TD	
PB(-1)	[rgb] .706, .776, .906 0,81 [rgb] .706, .776, .906 -0,091 [rgb] .706, .776, .906 [9,512]	[rgb] .706, .776, .906 -1,587 [rgb] .706, .776, .906 -0,264 [rgb] .706, .776, .906 [-6,001]	
TD(-1)	[rgb] .706, .776, .906 0 [rgb] .706, .776, .906 56 [rgb] .706, .776, .906 -0,021	[rgb] .706, .776, .906 0,636 [rgb] .706, .776, .906 -0,062 [rgb] .706, .776, .906 [10,286]	
Y_GAP(-1)	[rgb] .706, .776, .906 0,236 [rgb] .706, .776, .906 -0,116 [rgb] .706, .776, .906 [2,041]	[rgb] .706, .776, .906 -0,796 [rgb] .706, .776, .906 0,334 [rgb] .706, .776, .906 [-2,383]	[rgb] .70 [rgb] .70 [rgb] .706
C	[rgb] .706, .776, .906 -0,025 [rgb] .706, .776, .906 -0,008 [rgb] .706, .776, .906 [-3,056]	[rgb] .706, .776, .906 0,099 [rgb] .706, .776, .906 -0,024 [rgb] .706, .776, .906 [4,139]	
CRISIS	[rgb] .706, .776, .906 -0,096 [rgb] .706, .776, .906 -0,014 [rgb] .706, .776, .906 [-6,783]	0,061 -0,041 [1,496]	
RECOVERY	[rgb] .706, .776, .906 0,136 [rgb] .706, .776, .906 0,022 [rgb] .706, .776, .906 [6,104]	[rgb] .706, .776, .906 -0,251 [rgb] .706, .776, .906 -0,064 [rgb] .706, .776, .906 [-3,898]	
R-squared	0,858	0,936	
Adj, R-squared	0,837	0,926	
Sum sq, Resids	0,028	0,236	
S,E,equation	0,029	0,083	
F-statistic	40,979	98,857	
Log likelihood	88,68	45,908	
Akaike AIC	4,118	-1,995	
Schwarz SC	-3,865	-1,742	
Mean dependent	0,047	0,418	
S,D, dependent	0,071	0,307	
Determinant resid, covariance (dof adj.)		6,56E-09	
Determinant resid, covariance		4,03E-09	
Log likelihood		216,328	
Akaike information criterion		-9,916	
Schwartz criterion		-9,156	
Number of coefficients		18	

Notes: The detailed results of the VAR-estimates are presented. Based on these results, Table (2), Figure (3) in Subsection 4.2 and Figure (A1) in the Appendix are populated and generated. Standard errors in ( ) t-statistics in [ ]; light blue depicts t-values greater than ±1.65 for 10 percent probability. Source: Author's elaboration.

Table A.4: Model Specifications of OLS, Cubic OLS, GMM, TAR and VAR

	OLS	OLS^3	GMM	TAR_TD-break 40,3 percent	TAR_y_gap	VAR PB-equation
Adjusted R-squared	0,838	0,618	0,208	0,872	0,852	0,837
Durbin Watson	2,522	2,256	2,989	2,303	2,506	N/A
Serial Correlation Test	-	-	-	-	-	-
Heteroskedasticity Test	-	-	-	-	-	-
Ramsey RESET Test	-	-	-	-	-	N/A
Instruments	N/A	N/A	$PB_{t-2}\|TD_{t-3}$	N/A	N/A	N/A
Variance Inflation Factors	-	+	-	-	-	N/A
GMM: Difference in J-stats	N/A	N/A	N/A	N/A	N/A	N/A
GMM: Cragg-Donald F-stats	N/A	N/A	N/A	N/A	N/A	N/A
TAR: Break	N/A	N/A	N/A	40,3%	y-gap = 0	N/A
Inverse roots	N/A	N/A	N/A	N/A	N/A	-
Burger-rule: a4/(1-a2)	0,374	0,253	-0,257	0,661	0,297	0,431

Notes: The model specifications for each equation is presented. This table relates to Table (2) in Subsection 4.2. The null-hypothesis, - = was not rejected versus + = was rejected; N/A = not-applicable, not-available or not-valid. Source: Author's elaboration.