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**Working Paper**

## Twin Deficits in Suriname: An Empirical Analysis

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# Twin Deficits in Suriname: An Empirical Analysis

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## **Abstract**

This study investigates the relationship and directionality between the overall fiscal balance and the external current account balance of Suriname during 1970 - 2011. Both balances predominantly show deficits, however since 2006 the external current account balance shows surpluses due to the diversification of the mining sector as a result of booming international commodity prices. A vector error correction framework indicated the existence of a long-run relationship between these two variables. In the long run a bidirectional relation was found between the two balances, while in the short run no significant effect was encountered.

**Keywords:** Twin Deficits, Budget Balance, Current Account Balance

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## 1. Introduction

There have been many debates regarding the effects of public finances on the macroeconomic environment. One of these is the debate on twin deficits. This is when a country has a budget deficit and an external current account deficit at the same time. Research on this topic started in the 80's when the United States of America had both deficits at the same time at very high levels (Bartolini & Lahiri, 2006). From that moment on, numerous researchers have studied the possible link between these two deficits. Some have identified a unidirectional relationship where a deficit on the external current account is caused by the budget deficit or vice versa. Others have identified a bidirectional relationship in which both deficits affect each other. In some cases there is no relationship.

Suriname also experienced periods of twin deficits. As Suriname primarily exports alumina, crude oil and gold, more than 90% of total exports, revenues of the Government have been highly dependent on the commodity-based nature of its economy. It is therefore assumed that the two deficits are closely related to each other. The openness of the economy makes it vulnerable to external shocks (Fritz-Krockow, et al., 2009). Apart from world market effects, it has been argued that fiscal policy of the past has had a profound effect on the macroeconomic environment in Suriname.

This study seeks to investigate the relationship and directionality between the overall fiscal balance and the external current account balance of Suriname for the period 1970 to 2011. The overall fiscal balance represents the amount of money Government receives from tax and non-tax sources, minus any government spending. The external current account balance denotes the difference between a country's total receipts from exports and outlays on imports of goods and services, plus net remittances from migrant workers (factor income), and cash transfers (aid & grants), but excluding capital inflows or outflows. Hereafter we will refer to the overall fiscal balance as the budget balance (BB) and to the external current account balance as the current account balance (CAB).

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Unlike the effect of the budget balance on the current account, the effect of the current account on government finances has been described extensively for Suriname and is deemed to have a positive relationship. The added value of this study is based on the fact that empirical research on linkages between the current account and the budget balance has, as far as is known, never been done before for Suriname. Thus, it can be seen as a first step to investigate the relation between these two balances and seeks to provide insights for policy makers and fellow researchers regarding the dynamics of the current account and the budget balance.

The content of the paper is organized as follows: Section two provides an overview of developments of the current account and the fiscal balances of Suriname within the research period. The theoretical framework which provides some insight in the theories regarding the link between the two balances is discussed in section three while section four gives an empirical overview to show what has been done in recent years with regard to this subject. The focus here is on the different approaches that are used in previous studies. Section five addresses issues concerning data-analysis, methodology and interpretation of results. Finally, the conclusions and recommendations derived from the results are presented in the section six.

## **2. Budget and External Current Account Balances in Suriname**

By looking at the structure of the Surinamese economy, one can state that it is a commodity-based open economy<sup>1</sup>. The mineral dependency of Suriname is apparent from the high contribution of mining<sup>2</sup> to total exports value and total government revenue. Prior to political independence in 1975, government revenues in Suriname already largely depended on the revenues from the mining sector, mainly bauxite.

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<sup>1</sup> During 1970-2012 openness ranged between 51.4% and 94.5% (Central Bank of Suriname, 2012)

<sup>2</sup> Mining contribution to total exports was on average 93.6% and to government expenditures 26.2% (Central Bank of Suriname, 2012)

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Between 1970 and 1980 both balances show deficits, except for the budget balance in 1975. However, the budget balances were relatively lower in the seventies compared to the eighties. These relatively lower deficits were the results of higher revenues from the flourishing bauxite sector and Dutch development aid. The very high surplus in 1975 was because of the introduction of the bauxite levy at the end of 1974, retroactive to the beginning of 1974, and the grant Suriname received upon independence in 1975. The current account balance deteriorated because of increased international oil prices which negatively impacted on the import value of oil. In addition to the oil price shock there was also an increase in outlays for services rendered for the development of the domestic oil sector (offshore oil-drilling).

Caram (2007) indicates that one of several events that affected the economic environment of Suriname during the early 1980's was the decline of bauxite and alumina prices due to world market developments and stiff competition of new production centers as Brazil and Australia. The decline in export value of alumina, the then main commodity of the economy, resulted in a decline in government revenues. In 1980 the democratic regime changed into a military controlled regime and because of political tension between Suriname and the Netherlands, the Dutch aid, which was used to offset current account deficits, was suspended. As a consequence the inflow of foreign capital deteriorated even further.

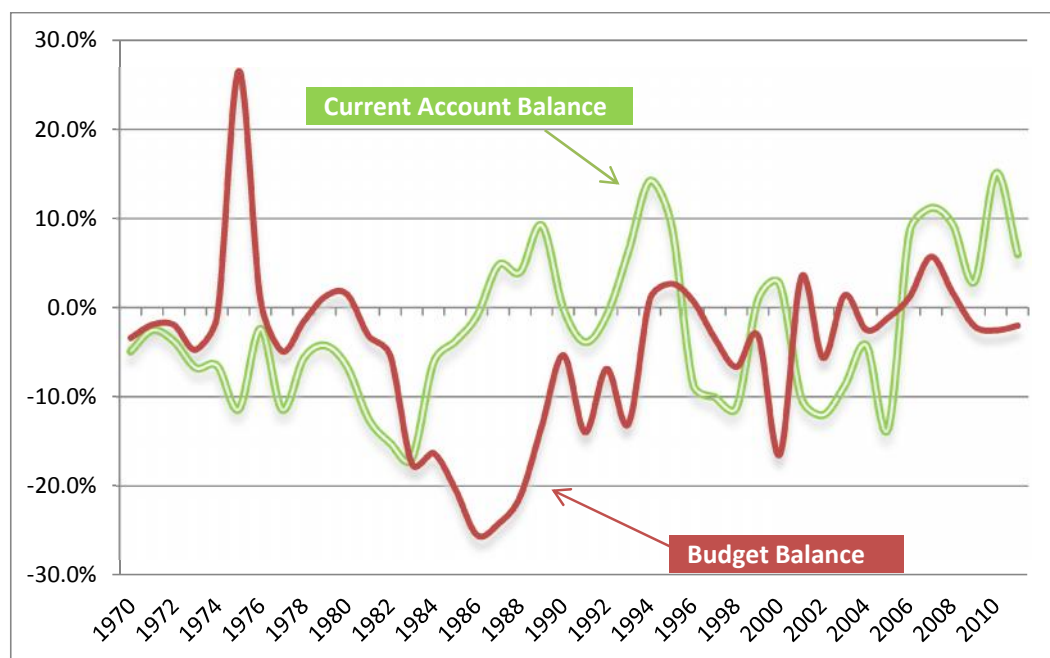
Despite the revenue losses from taxes and aid, the Government increased its expenditures. This widened the budget deficit even further. The deficit was financed primarily through credit by the domestic banking system. The growth in liquidity together with a fixed exchange rate system led to a depletion of the net international reserves because of the sustained current account deficits. This was a clear illustration of the occurrence of the twin deficits (see Figure 1) in Suriname (Caram, 2007).

From the late eighties and early nineties on, the budget balance started to improve slightly as in 1993 the Government implemented a Structural Adjustment Program (SAP). The main measures were the

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liberalization of the exchange rate regime and the improvement of the tax regime. Additional measures included the removal of government subsidies, domestic debt restructuring and the introduction of selling 'Powisie' gold certificates<sup>3</sup> to the public (Gaurisankar & Ong A Kwie, 2012).

**Figure 1: Development of External Current Account Balance and Budget Balance in Suriname (% of GDP)**



From 1992 onward, the current account of Suriname improved due to the increasing importance of the oil and small scale gold sector in total exports. Thus, inflows of foreign currency also started to accumulate, which improved the international reserves. The Dutch aid – which resumed – was channeled through foreign exchange auctions. The twin deficits (see Figure 1) reemerged when expansionary fiscal policy led to a deteriorating budget balance during 1996-1999. Due to fiscal dominance, the rapid growth of money supply caused high inflation. The current account deficit also widened in this time period partly because of the declining export value of alumina and an increase in the services from abroad for the execution of large infrastructural projects. This was reflected in a decrease in the international reserves (Centrale Bank van Suriname, 2001).

<sup>3</sup> A type of security to mop up excessive liquidity



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Van Dijck, Dijkstra, De Jong, Martin and Vos (2000) show that the boom and bust cycle of the “so important” bauxite sector influenced the revenues and thus the spending behavior of the government. Within the two cycles of the nineties they show how government finances reacted to the boom, the transition and the bust phase. It is noteworthy that during the nineties increases in government expenditures were driven by increases in government consumption –except for 1997 to 1999 where capital expenditures also increased because of large infrastructural projects.

Fritz-Krockow et al (2009) describe a clear link running from the exports of commodities to government revenues from the mid-nineties up to the end of the twentieth century. They listed crude-oil and alumina as the main contributors of government revenues and acknowledged the increasing contribution of gold in the 2000's. The authors indicated that the volatility in government revenues encouraged inadequate policy responses in the nineties. These responses in turn, led to periods of almost hyperinflation in the above mentioned period.

Since 2006 the current account balance (see Figure 1) has significantly improved, resulting in surpluses. The main contributors to this improvement are the mineral commodities – alumina, crude oil and gold – which provide an average 93% of total exports of Suriname (see Appendix 1). However, high international prices for oil and gold mainly account for these shifts in the current account balance. Despite these high revenue flows to the government, the budget balance (see Figure 1) did not seem to follow the trend of the current account balance due to increasing government consumption, namely total reform of wages<sup>4</sup> and election spending on the one side. On the other hand, small-scale gold mining – which contributes on average 60% to total gold exports – is well represented in the current account but make little or no contribution to Government revenues due to its informal nature. Mainly as a result of these developments the twin deficits ceased to exist from 2006 onwards.

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<sup>4</sup> “The objective of these efforts was to improve the competitiveness of civil servants’ pay, while at the same time making the civil service leaner and more efficient over time, including through natural attrition” (El-Masry & Mansilla, 2012).

### 3. Theoretical Framework

The theoretical basis of the relation between the budget balance and the current account balance can best be explained through the national income identity, according to which GDP (Y) is the sum of private consumption (C), private investment (I), government expenditure (G) and net exports (X-M), as represented in equation (1):

$$Y = C + I + G + (X - M) \quad (1)$$

GDP can also be defined as the sum of private consumption (C), private savings (S) and taxes (T):

$$Y = C + S + T \quad (2)$$

Substituting equation (2) in equation (1) results in:

$$C + S + T = C + I + G + (X - M) \quad (3)$$

Equation (3) can further be simplified and rearranged to:

$$(X - M) = (T - G) + (S - I) \quad (4)$$

where (X-M) is the current account balance; (T-G) is the budget balance and (S-I) is the savings and investment balance. From this equation it can be deduced that any irregularity in one of the balances comes from one or both of the other balances. If the (S-I) is assumed to be constant, then there would be a positive relation between (X-M) and (T-G) especially in the case of Suriname where “T” is largely determined by “X”.

There are several theories that explain the relation between the budget balance and the current account balance. The most debated theories are the Twin Deficit Hypothesis as the standard view and the Ricardian Equivalence Hypothesis as an alternative to the conventional view. According to the Twin Deficit Hypothesis an increase in the budget deficit will cause a corresponding increase in the current account deficit, where the transmission mechanism works in two ways. Firstly, based on Mundell-Flemming framework a worsening of the budget deficit puts an upward pressure on domestic interest

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rates which, in turn, will cause capital inflows to increase and the exchange rate to appreciate making imports cheaper and hence worsening the current account deficit. Secondly, an increase in the budget deficit would induce domestic demand for goods and services. Because of this imports will increase, which may result in the deterioration of the current account balance (Bagheri, Pirae, & Keshtkaran, 2012).

In his flagship paper, Barro focuses on the Ricardian Equivalence where he argues that according to the Ricardian modification to the standard analysis, a deficit-financed cut in current taxes means higher taxes in the future. Consumers therefore will increase their current savings rather than to increase their current spending. This will leave interest rates and thus investments unaffected which, in turn, will have no effect on the current account deficit (Barro, 1989), (Mankiw, 2003).

Other theories that describe the interaction between the two balances are the monetary approach to the balance of payments, current account targeting and the structural gap approach. The conclusions of the monetary approach to the balance of payments are similar to that of the Twin Deficit Hypothesis. However, these conclusions are based on the idea that budget deficits, depending on how they are financed, may increase money supply. An increase in money supply that is not accompanied by an increase in output will increase domestic demand; this will lead to a rise in imports and eventually to the deterioration of the current account (Ganchev, Stavrova, & Tsenkov, 2012). According to the current account targeting approach, the direction runs from the current account to the government's budget, under the condition that fiscal policy is aimed at improving the current account. The government budget then acts as adjustment variable, since the government can balance the current account by adjusting its budget to the difference between private savings and investments. When domestic investments exceed domestic savings, the government should run fiscal surpluses and in the opposite situation it should run deficits (Ganchev et al, 2012; Köhler, 2005). Supporters of the structural gap approach state that in small open economies current account deficits must, in the long run, lead to fiscal surpluses. This is based on the idea that the world financial system is closed, which

means that a savings-investment deficit of a country, can be financed by the savings-investment surplus of another country (Ahmad, Evan, & Ahmed, 2006).

A summary of the above shows that there are three possible outcomes between the budget and current account balance: a unidirectional relation that runs from budget balance to current account balance, no relation and a unidirectional relation that runs from the current account balance to the budget balance. However, in practice there are cases that a bi-directional relation exists where both balances influence each other.

#### **4. Empirical Literature Review**

The focus of this literature review is the link between the twin deficits in the Surinamese economy. It will concentrate on open, developing and commodity-exporting economies. A major part of the body of work on budget balance and current account balance points to the lack of uniformity in the way the link between these balances is approached. Data frequency varies from monthly, quarterly to annual data. Authors either use only the two deficits variables in their analysis or add transmitting variables. Some authors – for example Ng (2011) and Alkswani (2000) – even substituted the trade balance for the current account balance. Among the transmitters there is no uniformity as well and some might even be questioned on their relevance. The methods applied are diverse, though the vector autoregressive model, vector error correction model and Granger causality tests are frequently applied. This paragraph provides an overview of papers on the basis of data selection, methods of analysis, and results which are often categorized according to any of the four possible outcomes as presented in the last paragraph of the previous section.

Several papers within the examined body of works support the existence of a unidirectional relationship running from the budget balance to the current account balance. Vyshnyak (2000) gathered quarterly data on the budget balance and the current account balance over the period 1995 to 1999. By applying Granger causality test a unidirectional link was found running from the budget

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balance to current account balance for Ukraine. Tang & Lau (2009) used data on the current account balance, the budget balance, investment and private savings in their research over the period 1973 (first quarter) till 2008 (third quarter) for the United States of America. Though all variables are integrated of order one and at least one co-integrating vector is found among the variables, the authors applied the ordinary least square methods. They concluded that the evidence supported existence of the twin deficits derived from the general equilibrium perspective. Ganchev (2010) focused solely on the budget balance and the current account balance over the period 2000 to 2010 for Bulgaria. The author applied Granger causality, vector auto regression and vector error correction models. In contrast to other studies Ganchev presented unit root results after the results of the vector autoregressive model is presented. Despite the bidirectional results of the Granger causality, the vector autoregression and the vector error correction models depicted that there is a unidirectional relation in the long run. Studies that provide similar results are conducted by Bagheri, Pirae and Keshtkaran (2012) for Iran, Ahmet (2012) for Turkey and Chowdhury (2007) for Sri Lanka. Baharumshah, Lau and Khalid (2006) examine ASEAN-4 countries<sup>5</sup> and Bartolini and Lahiri conduct a panel study of countries from different continents, also finding evidence of a unidirectional link.

Some authors found a unidirectional link running from current account balance towards budget balance. Puah, Lau and Tan (2006) use annual figures from 1970 to 2005 to investigate the case of Malaysia. They apply a Toda Yamamoto Augmented Granger causality test<sup>6</sup> which confirms a unidirectional link from current account balance to budget balance and which they label Summer's reverse causation proposition<sup>7</sup>. Merza, Alawin and Bashayreh (2012) use quarterly data for Kuwait from 1993 to 2010. The vector autoregression, impulse response functions and Granger Causality test are applied from which they derive that there is a unidirectional relation between the current account balance and budget balance in the long run. Alkswani (2000) research the Twin Deficits Hypothesis for Saudi Arabia, using annual data from 1979 to 1999. He applies an error correction model, the

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<sup>5</sup> Indonesia, Malaysia, Philippines and Thailand

<sup>6</sup> This is how the procedure is known, but is called Toda Yamamoto Granger non-causality test by the author.

<sup>7</sup> Known as current account targeting

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Johansen co-integration method and Granger causality testing to conclude that there is a long run unidirectional relationship, running from current account balance to budget balance.

Some authors present cases of bi-directionality results. Hakro (2009) conducted the study for Pakistan using quarterly data from 1948 to 2005. Budget deficits, trade deficits, money supply, inflation, interest and exchange rate are examined as variables in the model to trace the direction of causation. Hakro uses a vector autoregressive model to determine that there is a bidirectional link between the budget deficits and the current account deficits. The causal link ran from the budget deficit to prices then to capital flows, the exchange rate, the interest rate and finally to the trade deficit. However there is no clear evidence to support his assertion of a direct link running from trade deficit to budget deficit. Furthermore it is not clear why, in the conclusion, Hakro introduces capital flows as this is not a part of his initial variables. Lau and Tang (2009) research the case of Cambodia using quarterly data over the period 1996 to 2006. The authors apply Johansen co-integration and hypothesis testing, Granger causality test and generalized variance decomposition. The two main results from this exercise are that the variables are co-integrated in the long run and that there is bi-directionality among these two balances. Further Alleyne, Lugay and Dookie (2011) provide similar results for several Caribbean countries and Waqas and Awan (2011) did the same for Pakistan.

Several authors found no link between the budget balance and the current account balance. Ng (2011) uses quarterly data from 1976 to 2010 to investigate the case of Argentina. The author applies vector auto regression and Granger causality tests to establish that there is no causal relationship between trade and budget deficit in either direction of the relationship. Farahbakhsh and Poorgholamali (2011) pool seventy countries, which according to the World Development Indicators are categorized into three groups consisting of high-, middle- and low-income countries and found no relation between the two balances for high income countries. Ganchev et al (2012) conduct a panel study for Central and Eastern European countries. They use data from 1998 to 2009 to which they apply an ordinary least squares panel regression, Granger causality and vector auto regression, impulse response analysis and variance decomposition. A barely significant unidirectional relationship is found utilizing the panel

regression; however the results of the vector autoregressive model are contradictory. The same results are provided by Djuri and Aristovnik (2010) for European Union member states and countries seeking European Union membership.

## 5. Data-analysis and Results

This section focuses on the empirical tests on the relationship between the BB and the CAB. The variables utilized are on an annual basis, ranging from 1970 to 2011 and data are collected from the Statistical Compendium of the Central Bank of Suriname (2012). Descriptive statistics of the relevant variables are presented in Appendix 1.

In order to select the appropriate econometric framework for this research, the structure and properties of the data are investigated. We develop a model to account for changes in the BB and the CAB, utilizing the money supply as an explanatory variable. The real money supply (M) is used as a proxy for this channel. BB is the real budget balance and CAB is the real current account balance. The variables were made real by dividing them by the GDP deflator<sup>8</sup>.

The first step in the analysis of economic variables is investigating graphically and statistically (by using unit root tests) whether the data are stationary. The results of well-known unit root tests, namely the Augmented-Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test, show that only the CAB is stationary in level. The variables BB and M are integrated of the order one (see Appendix 2).

The majority of the empirical studies we encountered employed vector autoregressive models (VARs) or vector error correction models (VECMs) to investigate the impact and relation between the BB and the CAB. Following these studies, we estimate a VAR using the BB, CAB and M. We checked for optimal lag length and the results of this test are presented in Appendix 3, indicating one lag as optimal length.

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<sup>8</sup> All the variables were expressed as % of GDP.

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Since the BB and M variables in the model are non-stationary, the possibility of cointegration should be taken into account. Therefore a Johansen Cointegration test is carried out. Cointegration indicates that a long-run relationship exists between two or more variables, in this case the current account balance, the budget balance and the money supply. The results of the cointegration tests (see Appendix 4) indicate the existence of at most one cointegrating vector with an intercept and linear trend. This implies that in the long run, the aforementioned economic variables move along with each other. Since a VAR model would produce biased results, a Vector Error Correction Model (VECM), which accounts for long-run and short-run relations, is estimated. This model is estimated with one lag and the standard residual diagnostics are carried out. To deal with issues of non-normality, a dummy variable is added for the year 1975. An empirical explanation for the dummy variable of 1975 is the introduction of the bauxite levy which caused government revenues to soar substantially (see section 2). After adding this dummy variable, the VECM produces robust results. Afterward the model was reduced for optimal results, using the general-to-specific approach. Table 1 presents the results of the VECM.

**Table 1: VECM Results<sup>9</sup>**

$(BB) = -0.27 \cdot [BB-1 - 1.36 \cdot CAB-1 + 0.67 \cdot M-1 - 26.13] - 0.33 \cdot (BB-1) + 30.40 \cdot Dum75$ $(-4.27)^{***} \quad (-4.96)^{***} \quad (4.35)^{***} \quad (-3.43)^{***} \quad (5.77)^{***}$		<b>Eq. 1</b>
R-squared 0.60	S.E. of regression 5.70	
Adjusted R-squared 0.58	Durbin-Watson stat 2.03	
$(CAB) = 0.25 \cdot [BB-1 - 1.36 \cdot CAB-1 + 0.67 \cdot M-1 - 26.13] - 0.45 \cdot (M-1)$ $(3.29)^{***} \quad (-4.96)^{***} \quad (4.35)^{***} \quad (-2.81)^{**}$		<b>Eq. 2</b>
R-squared 0.25	S.E. of regression 6.70	
Adjusted R-squared 0.22	Durbin-Watson stat 2.01	

t-values are displayed between brackets ( )

\*, \*\* and \*\*\* denote variables at 10%, 5% and 1% levels of significance

<sup>9</sup> As one may observe, the equation of the M variable is not presented in the paper, since it falls beyond the scope of this study.



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The long-run findings show that the current account balance positively and significantly impacts on the budget balance. In Suriname for example, changes in exports impact on the revenues of the public sector through taxes on export earnings<sup>10</sup>. The findings also indicate that the money supply negatively and significantly affects the budget balance in the long run.

On the other hand, the empirical findings show that the BB has a significant and positive impact on the CAB in the long run. A clear example where the budget balance positively affected the current account balance of Suriname might be the period of the Structural Adjustment Program which ran from 1993 to 1996. In that period, the government cut its spending resulting in a decreased demand for goods and services from abroad. The error correction terms for the BB and the CAB are respectively -0.27 and 0.25, both being significant. This means that deviations from long-run equilibrium are negatively correlated with changes in the BB, while the correlation between changes in the CAB and long-run equilibrium is positive.

In the short run, no significant effect was obtained between the CAB and BB. The BB has a negative lagged impact on itself, while M negatively impacts on the CAB in the short run. This negative effect of M on CAB can be ascribed to the increasing demand of (imported) consumption goods as a result of excess liquidity in the economy.

## 6. Conclusions and Policy Implications

This paper examines the link between the fiscal balance and current account balance in Suriname over the period 1970 to 2011. The major finding is that there exists a bidirectional relation between these balances in the long run, while in the short run no significant effect is encountered. These results correspond with the findings of earlier studies for Pakistan, Cambodia and several Caribbean states.

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<sup>10</sup> This finding is obvious for a resource rich developing country such as Suriname, since government earnings increase through taxation as export value, of especially mining products, increase.

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The positive link that runs from the current account balance to the overall fiscal balance is in line with many other empirical researches. Since Suriname is a small open commodity-exporting country, exports and imports provide the government its major source of income. The genesis of the positive impact of the overall fiscal balance on the current account balance may be traced to the period in the 1990's, when government current expenditure continued to expand, driven by increased wages to civil servants, even as alumina revenues were depressed by stagnant international prices.

There are already efforts underway in Suriname to implement measures that would minimize the impact of shocks that affect the external current account. These measures include establishing a Sovereign Wealth Fund (SWF) and diversifying the economy by developing agro-industrial production and tourism and by boosting entrepreneurship. This SWF will mitigate shocks to government revenues in the short term while diversification enables the economy to respond better to external shocks in the long run. Another measure that will be taken is the implementation of a gold tax (to target small-scale gold mining) which will broaden the tax base and positively influence revenues. Such policy measures might benefit the budget balance and minimize domestic shocks to the current account balance.

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# Twin Deficits in Suriname: An Empirical Analysis

## Appendices

### Appendix 1 – Descriptive Statistics

	Budget Balance (% of GDP)	Current Account Balance (% of GDP)	Real Money Supply (%) of GDP)
<b>Mean</b>	-4.83	-2.40	2.78
<b>Median</b>	-2.86	-3.82	2.58
<b>Maximum</b>	26.55	15.09	5.62
<b>Minimum</b>	-25.43	-16.91	0.78
<b>Std. Dev.</b>	9.33	8.32	1.20
<b>Skewness</b>	0.12	0.36	0.69
<b>Kurtosis</b>	5.04	2.23	2.81
<b>Jarque-Bera</b>	7.37	1.93	3.43
<b>Probability</b>	0.03	0.38	0.18
<b>Observations</b>	42	42	42

### Appendix 2 - Unit Root Test Results

	Level			First Differences		
	Budget Balance	Current Account Balance	Money Aggregate	Budget Balance	Current Account Balance	Money Aggregate
Intercept	-2.065	-3.050**	-1.076	-9.214***		-4.376***
ADF <sup>1</sup> Trend & Intercept	-2.057	-3.449*	-1.610	-9.103***		-4.376***
None	-1.934*	-3.003**	1.221	-9.334***		-4.376***
Intercept	-3.175**	-3.012**	-0.746	-10.648***		-4.536***
PP <sup>1</sup> Trend & Intercept	-3.142	-3.327*	-1.273	-11.072***		-4.507***
None	-2.664***	-2.951***	0.912	-10.810***		-4.417***

\*, \*\* and \*\*\* denote variables at 10%, 5% and 1% levels of significance

<sup>1</sup> ADF & PP tests display t-values

# Twin Deficits in Suriname: An Empirical Analysis

## Appendix 3 – Lag length results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-431.81	NA	969217.00	22.30	22.43	22.34
1	-387.76	79.05	161019.70	20.50	21.01*	20.68*
2	-377.26	17.25*	150467.7*	20.42*	21.32	20.74
3	-373.92	4.97	205898.00	20.71	21.99	21.17

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

## Appendix 4 – Johansen Co-integration Test Results

Number of Cointegrating Equations	Eigenvalue	Trace Statistic	Trace p- value	Max-Eigen Statistic	Max-Eigen p-value
None *	0.42	33.96	0.02*	21.50	0.04
At most 1	0.19	12.46	0.14	8.23	0.36
At most 2 *	0.10	4.23	0.04*	4.23	0.04

\* Denotes rejection of the hypothesis at the 0.05 level



# Twin Deficits in Suriname: An Empirical Analysis

## Appendix 5 – Budget Balance<sup>1</sup>, Current Account Balance and Money Supply in percentage of GDP

	BB	CAB	M		BB	CAB	M
1970	-3.40	-4.90	25.03	1991	-13.97	-3.85	55.63
1971	-1.91	-2.54	27.85	1992	-6.85	-0.86	42.16
1972	-1.94	-3.78	29.98	1993	-13.06	6.26	23.66
1973	-4.73	-6.73	29.10	1994	0.94	14.23	13.01
1974	-0.88	-6.52	30.02	1995	2.68	9.24	23.48
1975	26.55	-11.40	31.99	1996	0.73	-8.62	32.20
1976	0.90	-2.36	35.02	1997	-3.44	-10.04	32.94
1977	-4.89	-11.43	36.58	1998	-6.63	-11.20	33.47
1978	-1.55	-5.68	37.00	1999	-3.18	0.93	26.48
1979	1.26	-4.26	36.80	2000	-16.49	2.65	29.46
1980	1.50	-6.62	39.55	2001	3.44	-10.15	36.36
1981	-3.18	-12.49	41.09	2002	-5.63	-12.04	36.92
1982	-5.39	-15.18	44.56	2003	1.39	-8.75	36.24
1983	-17.51	-16.91	49.14	2004	-2.49	-4.21	40.45
1984	-16.32	-6.14	57.32	2005	-1.15	-13.64	37.25
1985	-20.31	-3.79	63.15	2006	1.21	8.51	42.61
1986	-25.43	-0.92	59.77	2007	5.72	11.19	48.20
1987	-24.19	4.77	53.00	2008	1.65	9.30	51.00
1988	-21.16	3.99	65.37	2009	-2.07	2.91	56.29
1989	-13.29	9.23	72.55	2010	-2.54	15.09	54.21
1990	-5.33	-0.09	60.13	2011	-2.02	5.98	54.55

Source: Central Bank of Suriname

<sup>1</sup> Excluding statistical discrepancy