

## **Fiscal Rules in the Monetary Union of Curaçao and Sint Maarten**

*What impact has the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten had on fiscal discipline and economic growth in Curaçao?*

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### **Abstract**

The purpose of this paper is twofold. First, the rule-based fiscal framework of the Euro Area is compared to that of the monetary union of Curaçao and Sint Maarten to pinpoint lessons learned from the former. Second, using multiple linear regression models for the period 2002-2016,<sup>2</sup> the rule-based fiscal framework of the monetary union of Curaçao and Sint Maarten is examined to test whether it has contributed to fiscal discipline and economic growth in Curaçao. The results suggest that fiscal rules generate fiscal discipline and limit the use of stock-flow adjustments, but contribute negatively to economic growth in Curaçao.<sup>3</sup>

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<sup>2</sup> The author is aware that the sample size of the study is small. Unfortunately, due to (substantial) data constraints, it was not possible to gather a larger dataset for Curaçao and include Sint Maarten in the analysis.

<sup>3</sup> These results underscore the need to address other macroeconomic areas such as improving competitiveness, improving the investment climate, and mobilizing the labor market of Curaçao to foster economic growth. The sole presence of fiscal rules—which generates fiscal discipline—is not sufficient to achieve the desired outcome.

## **1. Introduction**

The experience with the global financial crisis has raised concerns about debt sustainability in many countries. The need for fiscal discipline has been highlighted by the sharp rise in government debt and deficit levels along with the fiscal challenges these countries have been coping with, notably their rapidly aging populations. Fiscal discipline is a prerequisite for sustainable economic growth. This discipline is particularly crucial for monetary unions that consist of a centralized monetary authority and decentralized fiscal authorities because, in these unions, individual members can no longer apply monetary policy measures to adjust for country-specific shocks. Therefore, the role of national fiscal policies and fiscal discipline becomes crucial. Many governments around the world have adopted fiscal rules to strengthen fiscal discipline and reduce the deficit bias and short-term electoral considerations (Sacchi and Salotti 2015).

Empirical evidence shows that fiscal rules tend to be associated with better fiscal performance (IMF 2009). However, research has been aimed mostly at the impact of fiscal rules on fiscal performance in the European Union (EU), many of which face fiscal imbalances and spiraling debt-to-GDP ratios despite the presence of fiscal rules (Marneffe et al. 2011). Evidence of the impact of fiscal rules on economic growth has been mixed. Some authors argue that fiscal rules have restrictive effects on growth (e.g. Soukiazis and Castro 2003), while others suggest that rules are not harmful to growth (e.g. Castro 2011).

This paper contributes to the academic literature in two ways. First, the case of the Euro Area is scrutinized to highlight the main lessons learned from implementing its rule-based fiscal framework. Second, this paper zooms in on the monetary union of Curaçao and Sint Maarten to examine whether its rule-based fiscal framework has succeeded so far in ensuring fiscal discipline and economic growth in Curaçao.

The paper is organized as follows. Section 2 defines the discretionary approach and the rule-based approach toward fiscal policymaking. Also, the impact of fiscal rules on fiscal performance and economic growth based on evidence from the EU is discussed. Then the formation of the monetary union of Curaçao and Sint Maarten and its experience with implementing its fiscal rules are described. Section 3 outlines the data and method used for the empirical approach. Section 4 presents the regression results and additional tests to prove the robustness of the results. Section 5 offers the conclusion.

## **2. Literature Review**

### **2.1 Rationale for Fiscal Rules**

A primary task of the government is to demonstrate fiscal discipline conducive to sustainable economic growth. For this reason, many studies have examined whether fiscal discipline is better achieved through a discretionary or a rule-based approach to fiscal policymaking. This section compares both frameworks and discusses why the rule-based approach is often preferred.

#### **2.1.1 Discretionary Fiscal Policy Framework**

Discretionary fiscal policies are nonmandatory government actions in response to economic shocks, mostly occurring in poor economic times, thereby causing its subjective nature (Boundless 2011). For years, governments benefitted from this approach as they were able to choose their budget targets without any restrictions on their budget balance in the short- and medium-term (Duisenberg 2003). However, this approach continually resulted in time lags between the design and

implementation of fiscal policy measures.<sup>4</sup> Discretionary policies also were influenced by the governments' shortsightedness, which focused on short-term electoral considerations (Rogoff 1990). Consequently, governments easily increase spending or cut taxes during an economic slowdown but are reluctant to build buffers during favorable economic times (Duisenberg 2003).

### 2.1.2 Rule-based Fiscal Policy Framework

Following the drawbacks of the discretionary approach, the use of the rule-based approach became more popular over the past two decades. The latter approach seeks to promote macroeconomic stability, support monetary policy, safeguard debt sustainability, avoid adverse spillovers, and provide credibility.<sup>5</sup>

- A. *Macroeconomic stability:* If applied flexibly, the rule-based approach enables the free functioning of automatic stabilizers. Automatic stabilizers increase budget deficits during economic recessions and reduce deficits during economic expansions without the need for fiscal policy adjustments,<sup>6</sup> thereby contributing positively to economic growth and long-term employment.
- B. *Support for monetary policy:* Fiscal rules support monetary policy. Fiscal policy typically affects consumer prices through changes in aggregate demand or taxes, while monetary policy affects typically short-term interest rates, which affect the government's budget and the economy. Decisions from the monetary authority affect the variables underlying the decisions from the fiscal authorities and vice versa. Thus, monetary unions require the presence of institutional frameworks that coordinate the interactions between the monetary policy and national fiscal policies.<sup>7</sup>
- C. *Avoid adverse spillovers:* Fiscal rules are more prominent in monetary unions with a centralized monetary policy and decentralized fiscal policies as these unions tend to prompt individual members to incur excessive debt or deficit levels, which can be transmitted to the union through credit downgrading or higher market interest rates. Adherence to fiscal rules promotes sound public finances and, thereby, avoids such adverse spillovers.
- D. *Debt sustainability:* Unsound public finances have inter-temporal as well as intergenerational consequences because excessive debt burdens are redistributed across generations as well as between the stakeholders within generations (Buiters 2014). Excessive debt levels not only crowd out productive private investment but they also negatively affect the government's creditworthiness and put pressure on economic growth (Duisenberg 2003). If a country's outstanding debt grows faster than its output, this situation will provide a negative signal to financial markets as the debt-to-GDP ratio might spiral (Romero 2013). Increasing debt-to-GDP ratios cause the government's creditworthiness to deteriorate because investors lose confidence in the government's capacity to manage its debt.

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<sup>4</sup> When fiscal policy measures were implemented to stabilize business cycles, they sometimes became effective after the cycle had already passed.

<sup>5</sup> The advantages of the rule-based approach are based on Kopits and Symansky (1998) unless stated otherwise.

<sup>6</sup> Examples of automatic stabilizers include progressive corporate and income tax rates.

<sup>7</sup> This paper does not elaborate on the institutional pre-conditions required for an effective monetary union. Currently, no institutional framework is in place in the monetary union of Curaçao and Sint Maarten to coordinate interactions between the national fiscal policies. However, as Larch et al. 2010 argue, a monetary union without a well-established fiscal union can prompt national governments to seek free-rider opportunities.

If the growth in government debt becomes structural, the government's ability to borrow from capital markets may be limited; such was the case for various euro area members (see section 2.3.2).<sup>8</sup>

- E. *Fiscal policy credibility*: Fiscal rules can promote confidence in financial markets, households, and businesses because of long-lasting constraints on the government's debt and deficit levels. Nonetheless, the government's credibility is subject to the degree of compliance with the rules. Therefore, fiscal rules should be complemented by fiscal councils to monitor compliance as discussed in section 2.2.2.

Despite the advantages above, fiscal rules have some disadvantages. First, a lack of political commitment may prevent the sustainment of the rules and undermine the government's credibility (IMF 2009). Also, particularly deficit and debt rules may generate a procyclical stance in poor economic times as they limit government's discretionary policies, while not providing the necessary fiscal discipline during prosperous economic times. Moreover, the implementation of sanctions for noncompliance is crucial to avoid negative spillovers of free-riding behavior by one country in the other countries in the monetary union (Balassone and Franco 2001; Kopits 2007). Furthermore, fiscal rules may put pressure on the quality of fiscal policy, thereby drawing governments away from other priorities (IMF 2009).<sup>9</sup> Last, governments can be tempted to use creative accounting and off-budget operations to ensure compliance with the rules.<sup>10</sup>

## 2.2 Fiscal Discipline through Rules and Councils

This section discusses the characteristics of fiscal rules and fiscal councils to ensure fiscal discipline (Adam and Iacob 2014). Fiscal discipline forms a prerequisite for economic growth, particularly in monetary unions that are composed of a centralized monetary authority and decentralized fiscal authorities as individual members must rely on national fiscal policies to react to country-specific shocks.

### 2.2.1 Adopting Fiscal Rules

Amo-Yartey (2014) argues that fiscal indiscipline arises because of the so-called common pool problem inherent to the government's budget decision-making process. As governments typically comprise multiple decision makers, they compete for the same pool of available fiscal resources. Hence, fiscal policy tends to be biased towards excessive government spending, which can be limited by adopting fiscal rules. Fiscal rules are direct and durable constraints on the fiscal policy framework of either a monetary union or a country (Durevall 2011; Budina et al. 2012).

Literature distinguishes two types of fiscal rules: procedural and numerical rules. Procedural rules stipulate action plans for the government's budgetary process, aiming to develop good practices, enhance predictability, accountability, transparency, and financial management (Van Eden et al. 2013; Ter-Minassian 2007). Numerical rules are limits on the government's budgetary aggregates.<sup>11</sup> Research shows that numerical rules increasingly are preferred because they are measurable, while procedural rules are better to implement when countries exhibit a weak record of fiscal policy

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<sup>8</sup> As the European Central Bank noted (ECB Bulletin 2003): "Upholding trust in the soundness of public finances enhances confidence among all economic agents and thereby contributes to sustainable growth in consumption and investment."

<sup>9</sup> For instance, easy-to-cut capital spending may generate high social returns, while negatively impacting long-term economic growth.

<sup>10</sup> Such a situation is more likely to occur when countries incur massive deficit and debt levels with sustainability concerns.

<sup>11</sup> In this paper, fiscal rules refer to numerical rules unless stated otherwise.

implementation (Ter-Minassian 2007). The main advantage of numerical rules is that they aim to prevent the government from incurring excessive deficit levels that lead to unsustainable debt-to-GDP ratios—the deficit bias. Besides, they prevent carrying out procyclical measures that cause macroeconomic imbalances and instability (Ayuso-i-Casals 2012). Nonetheless, these rules can distort the flexibility of the government’s policy plans or encourage the government to execute suboptimal plans to meet the rules in the short term. Therefore, numerical rules require the presence of an adequate public financial management system (Ter-Minassian 2007; IMF 2009).

Four types of numerical rules can be distinguished: debt rules, budget balance rules, expenditure rules, and revenue rules (Budina et al. 2012).<sup>12</sup> Debt rules limit the debt-to-GDP ratio and aim for debt sustainability.<sup>13</sup> Budget balance rules limit the total, current, primary, or structural government budget, either for one year, some years, or an economic cycle. These rules seek to prevent the government from over-committing, overspending or generating insufficient income. Expenditure rules limit total, primary, or current government spending, either in absolute terms, as a growth rate or as a percentage of Gross Domestic Product (GDP). Expenditure rules seek to improve the government’s way of managing its expenditures and, thereby, stimulate fiscal discipline. Revenue rules set a ceiling or a floor for the government’s revenues and seek to influence the tax collection or increase revenues.<sup>14</sup>

Because each of these rules has limitations, many individual countries and monetary unions prefer to adopt multiple rules because one rule cannot target various objectives at the same time (Amo-Yartey 2014).<sup>15</sup>

The following principles are required to ensure adequate fiscal rules:

- A. *Well-defined fiscal rules:* Evidence shows that fiscal rules are more effective when targeted at all government levels (ECB 2013). Rules also should involve variables that are directly managed by the government (Bernanke 2010), and a direct connection should exist between the rules and the objective (IMF 2009).<sup>16</sup>
- B. *Binding fiscal rules:* Fiscal rules should be included in national law or a country’s constitution and should focus on multi-annual targets to foster compliance (ECB 2013). However, the rules should provide sufficient flexibility to react to unanticipated shocks (IMF 2009). Therefore, escape clauses should be formulated and limited to shocks beyond the control of the government (ECB 2013).
- C. *Enforceable fiscal rules:* In the case of noncompliance with the fiscal rules, a correction mechanism should be triggered to bring deviations from the rules back on the correct path (IMF 2009; ECB 2013). Effective enforcement further requires well-defined and credible sanctions (ECB 2013). Sufficient transparency also is needed to guide economic stakeholders, the general public, and investors in the financial markets in understanding the

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<sup>12</sup> See table 1 in Budina et al. (2012) for a detailed overview of the advantages and disadvantages of these rules.

<sup>13</sup> That is, the government’s ability to meet its current as well as its future debt obligations.

<sup>14</sup> Fiscal rules can be formulated as backward-looking, i.e., focusing on the past, near-term, i.e., focusing on the current year or forward-looking, i.e. focusing on the future, though the latter has mostly become more popular thanks to its dynamic structure. Despite its popularity, forward-looking rules lack simplicity and transparency and might even delay government’s policy decisions because of uncertainties in the future. Meanwhile, backward-looking rules can pose restrictions on the government’s current policies as the latter must compensate for incorrect policy decisions or forecasts made in earlier years (Scottish Government 2013).

<sup>15</sup> Debt rules, for instance, support debt sustainability but do not provide clear yardsticks to the government to manage its daily operations (Budina et al. 2012). However, if the debt rule is combined with a cyclical budget balance rule, the government can accomplish both objectives.

<sup>16</sup> For example, to promote debt sustainability (the objective), a debt rule (fiscal rule) could be adopted.

government's decisions (IMF 2009). Kilpatrick (2001) argues that the degree of transparency runs parallel to the degree of strictness of the rules; the higher the transparency, the lower the required strictness. The presence of fiscal councils, which supervise compliance with the rules, promotes transparency (Calmfors and Wren-Lewis 2011). Finally, fiscal rules should not be politically influenced (Bernanke 2010).

### 2.2.2 Incorporating Fiscal Councils

Fiscal councils are independent public institutions of the national governments in a monetary union who seek to promote sound public finances through the following functions.<sup>17</sup>

- A. *Reviewing and monitoring the government:* Fiscal councils independently review the annual and medium-term government budgets to monitor compliance with the fiscal rules. In fulfilling their supervisory role, the councils apply macroeconomic analyses of the government's policies, plans, and performance and conduct research on various areas concerning the future soundness of the country's public finances.<sup>18</sup>
- B. *Developing macroeconomic forecasts:* Fiscal councils could be mandated to develop macroeconomic and budgetary forecasts for the government.
- C. *Enhancing the government's credibility:* The presence of fiscal councils prevents the government from basing its budgets on unrealistic forecasts. If the government's forecasts vary considerably from those estimated by the council, the government can be denounced publicly or forced to comply with the rules or explain its noncompliance.
- D. *Performing an advisory role to the government:* Fiscal councils could fulfill an advisory role to the government by formulating general or specific recommendations. General recommendations refer to policy issues chosen by the councils themselves.<sup>19</sup> Specific recommendations concern controversial issues that require particular attention and a consensual approach to fiscal policymaking. Governments must pay attention to the recommendations by their councils to prevent losing credibility (Adam and Iacob 2014).
- E. *Addressing the problem of fiscal illusion:* Fiscal councils could address the problem of fiscal illusion<sup>20</sup> by educating the general public and policymakers on the essence of sound public finances (IMF 2013).

The following principles are required to ensure adequate fiscal councils:

- A. *Strict political independence:* Fiscal councils should be operationally and legally independent from politics to avoid short-term electoral considerations (IMF 2013).
- B. *Strong public voice:* Fiscal councils should have a strong presence in the media to promote credibility and transparency (IMF 2013; ECB 2013). Public accountability could be stimulated by requiring the government to comply or explain (ECB 2013).

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<sup>17</sup> These functions are based on IMF (2013) unless stated otherwise.

<sup>18</sup> For example, fiscal councils could analyze the impact of the rapidly aging population on the social security system.

<sup>19</sup> These recommendations typically apply to countries with a vibrant public debate and a relatively collective approach toward fiscal policymaking.

<sup>20</sup> Fiscal illusion is when the population at large exhibits poor understanding of the fiscal rules. For example, the fact that the government could quickly get away with raising tax income because consumers do not correctly understand how the tax system functions create a fiscal illusion.

- C. *Supervisory role of the government:* Fiscal councils should have an unambiguous and unequivocal supervisory role about the government's compliance with the rules (IMF 2013).
- D. *Monitoring or developing forecasts:* Fiscal councils should monitor and develop macroeconomic and budgetary forecasts for the national governments.

## **2.3 Fiscal Rules, Fiscal Performance, and Economic Growth**

This section discusses research carried out on the impact of fiscal rules on fiscal performance and economic growth in the EU with particular attention to the Euro Area. Furthermore, the rule-based fiscal framework of the Euro Area is discussed, highlighting the lessons learned. These lessons should be considered to prevent repeating the mistakes of the Euro Area.

### **2.3.1 Empirical Evidence from the European Union**

Most empirical studies on the impact of fiscal rules on fiscal performance have been carried out for the EU members (IMF 2009). Evidence shows that stringent fiscal rules are correlated with cyclically adjusted primary balances, but the relationship weakens when the primary balances are replaced by a change in the debt-to-GDP ratio. At the same time, budget balance and debt rules seem to contribute to better budgetary outcomes (IMF 2009), which could be the reason why most individual countries and monetary unions prefer to adopt these types of rules (see figure 5 in Budina et al. 2012).

For the Euro Area, Marneffe et al. (2011) conclude that fiscal rules have a positive impact on fiscal performance when fiscal performance is estimated by the total budget balance and the primary budget balance. Fiscal rules also seem to have a negative impact on government spending, but no significant impact on government revenues. Despite the presence of fiscal rules in the Stability and Growth Pact (SGP), the average economic growth in the Euro Area contracted consistently, notably in the aftermath of the recent financial crisis, and stock-flow adjustments systematically increased government debt, while deficits remained below the target (Larch et al. 2010).

However, no consensus exists in academic literature concerning the impact of fiscal rules in the SGP on economic growth in Europe. Some authors argue that rules have restrictive effects on growth (Soukiazis and Castro 2003; Hein and Truger 2005), while others find evidence that rules are required to stimulate fiscal consolidation and economic stability in the Euro Area, which in turn supports economic growth in the long-term (Castro 2011; Menkulasi 2016).

### **2.3.2 Lessons Learned from the Euro Area**

A well-known monetary union is the Euro Area, consisting of 19 EU members<sup>21</sup> that adopted the euro as their common currency. Monetary policy is executed by the joint monetary authority, the European Central Bank (ECB), whose primary objective is to maintain price stability, while fiscal policy is conducted by the national governments of the members. Fiscal discipline is achieved through the adoption of a rule-based fiscal framework in which members must maintain a deficit-to-GDP ratio of below or equal to 3% and a debt-to-GDP ratio of below or equal to 60%. However, the main problem of the Euro Area was that its rule-based fiscal framework was not able to deliver fiscal discipline at the national level (Schuknecht et al. 2011; Seng and Biesenbender 2012; Hitaj and Onder 2013). In practice, several members breached the rules even before the financial crisis that started in 2007 and, despite being part of the corrective arm, no sanctions were imposed on the

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<sup>21</sup> The 19 EU member countries are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

noncompliant members. Examining the case of the Euro Area during the financial crisis shows that various lessons can be learned from its experience with implementing its rule-based fiscal framework.<sup>22</sup>

A. *National commitment:* The SGP's preventive arm was not 'preventive' as it did not encourage the use of procedural tools, such as early warnings or policy recommendations by the European Commission (EC). For instance, the economic upturns in 1999 and 2000 were not used to build up fiscal buffers and lower structural deficits. Consequently, some members already registered high deficit levels before the crisis. Although the debt and budget balance rules were supposed to have equal importance, the debt rule also was often ignored. The first lesson is that union members should always remain cautious, applying fiscal adjustments during prosperous economic times to maintain a sound fiscal position in weak economic times.

Despite the ECB's warnings since 2000 (ECB 2000), no attention was paid to the suspicion of creative accounting by the Greek government; its Excessive Deficit Procedure (EDP) was even annulled in 2007. Consequently, the ECB's suspicions were not confirmed until 2009 (Schuknecht et al. 2011). A second lesson is that the provision of reliable, timely, and complete government statistics is crucial to prevent creative accounting and ensure the union's stability.

B. *Independent supervision:* Although the EC identified the noncompliant members and prepared the recommendations, it had advisory power only and no strict surveillance on national fiscal policies. The SGP was influenced mostly by political discretion from the European Council of Ministers as it was the ultimate decision-making authority, consisting of the members' ministers of economics or finance. Hence, sanctions that had to be implemented on the noncompliant members were never applied. The SGP was even revised in 2005, granting the members more flexibility to choose their fiscal objectives in the medium-term (Fischer et al. 2006). A third lesson learned is that supervision must be independent and supplemented by enforcement mechanisms, including sanctions.

C. *Robust corrective mechanisms:* The 2010 sovereign debt crisis showed that the Euro Area's focus merely on price stability and sound public finances was not sufficient to ensure macroeconomic stability as business and financial cycles tend not to be synchronized.<sup>23</sup> A fourth lesson learned is that macro-prudential policy<sup>24</sup> sustained by automatic corrective mechanisms<sup>25</sup> is required to improve the resilience of the entire macroeconomic system and smooth the financial cycle (ECB 2011; Constâncio 2015).

D. *Crisis management framework:* Because the SGP lacked clearly defined escape clauses, the members were forced to implement discretionary fiscal policies during the crisis, thereby jeopardizing the credibility and sustainability of the fiscal rules. A fifth lesson is that when a monetary union experiences severe economic conditions, it should be able to implement escape clauses if compliance with the rules is no longer viable. When the 2010 sovereign

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<sup>22</sup> The lessons learned are based on Larch et al. 2010, Schuknecht et al. 2011, and the author's point of view unless stated otherwise. The SGP has evolved significantly over the years, but these lessons reflect the weaknesses of the rule-based fiscal framework identified during the crisis.

<sup>23</sup> Financial cycles correspond to fluctuations in credit, leverage, and asset prices, while business cycles refer to fluctuations in real economic activity (Constâncio 2015).

<sup>24</sup> Macroprudential policy can address the macroeconomic vulnerabilities of each country in a monetary union.

<sup>25</sup> Robust corrective mechanisms should be triggered automatically whenever members cannot comply with the rules, and fiscal and other macroeconomic imbalances persist (ECB 2011). However, corrective mechanisms should not be open to political discretion or members' interpretations.



debt crisis heightened in Greece, it soon became evident that declaring the country as “default” was not an option to avoid jeopardizing the financial stability of the Euro Area. Due to the lack of crisis resolution mechanisms, the European Council of Ministers was forced to create rescue mechanisms quickly: the European Financial Stability Facility and the European Stability Mechanism to assist those members in financial trouble. A sixth lesson is that a monetary union should own crisis resolution mechanisms that can deal with solvency crises to avoid contagion risks.

## **2.4 The Monetary Union of Curaçao and Sint Maarten**

This section discusses the formation of the monetary union of Curaçao and Sint Maarten, followed by a comparison between the rule-based fiscal framework of this union and the Euro Area. Also considered is the experience of the monetary union of Curaçao and Sint Maarten with implementing its fiscal rules.

### **2.4.1 The Formation of the Monetary Union of Curaçao and Sint Maarten**

Upon the dissolution of the Netherlands Antilles on 10 October 2010, Curaçao and Sint Maarten became autonomous countries, forming a monetary union with a common currency; the Netherlands Antillean guilder. Since 2010, monetary policy has been executed by a joint monetary authority, the Centrale Bank van Curaçao en Sint Maarten (CBCS), while fiscal policy has been implemented by the national fiscal authorities of Curaçao and Sint Maarten. As part of the constitutional reform, the Netherlands provided debt relief to both countries to help them launch their new constitutional status with sound fiscal positions. Therefore, by the end of 2010, Curaçao and Sint Maarten registered healthy debt-to-GDP ratios of 34.6% and 21.5%, respectively.<sup>26</sup>

To avoid future unsustainable debt accumulation, the debt relief from the Dutch government was supplemented by other agreements. Curaçao and Sint Maarten had to agree to a strict rule-based fiscal framework stipulated in the Kingdom Act Financial Supervision (Kingdom Act). This rule-based fiscal framework was one of the leading conditions for the initiation of the debt relief.<sup>27</sup> According to the Kingdom Act, the national governments of Curaçao and Sint Maarten must adhere to the golden budget rule, meaning that current revenues and current expenditures must be balanced in multi-annual terms (i.e., the current budget balance rule), while the capital account may register deficits only in the case of public investments.<sup>28</sup> Adherence to the rules is monitored by the Board of Financial Supervision for Curaçao and Sint Maarten (“College Financieel Toezicht” or CFT)<sup>29</sup> and the governments can borrow only after approval from the CFT.

As part of its evaluation, the CFT tests the planned government borrowings against the International Standard of National Accounts (ISNA). This standard calls for conducting an absorption capacity

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<sup>26</sup> The healthy debt ratios would not have been the case without the debt relief.

<sup>27</sup> The debt relief program had already started in January 2009 for the central government of the Netherlands Antilles and in April 2009 for the island government of Curaçao after both entities had complied with the requirements, which included balanced budgets and strengthening financial management. Financial supervision also was established at that point to temporarily monitor the public finances of the government entities. However, from the moment Curaçao and Sint Maarten became autonomous countries on 10 October 2010, financial supervision became formal as stipulated in the Kingdom Act.

<sup>28</sup> Governments are thus not allowed to borrow for current expenditures and financial transactions as these typically generate only short-term benefits. Public investments, on the other hand, are expected to generate long-term benefits.

<sup>29</sup> However, the CFT was not created as an independent body to monitor compliance of the national governments of Curaçao and Sint Maarten with their fiscal rules forever. According to the Kingdom Act, the role of the CFT had to be reviewed five years after its establishment. Therefore, by the end of 2015, this evaluation was performed by the Kingdom Council of Ministers who indicated that the CFT could continue with its role. Such evaluation will be repeated at least every three years.

test to examine whether a country is capable of executing the planned capital investments within a particular fiscal year. The CFT must also take into account that interest payments are not allowed to exceed five percent of the average government revenues in the previous three years—the interest burden rule. Once approval is obtained from the CFT, the government bonds are issued with a standing subscription by the Dutch State Treasury Agency (DSTA), meaning that the Dutch government must subscribe to all new government loans at borrowing rates similar to those of comparable government bonds issued in the Netherlands.<sup>30</sup> Despite the strictness of the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten, the Kingdom Act provides some flexibility concerning unanticipated shocks. The flexibility clause enables the national governments of Curaçao and Sint Maarten to deviate from the fiscal rules in the case of a disaster, for instance (College Financieel Toezicht 2010).

Table 1 provides a comparison between the rule-based fiscal framework of the Euro Area after some corrections were made for the flaws identified during the crisis, and that of the monetary union of Curaçao and Sint Maarten. The fiscal frameworks in these unions have many similarities. However, the most significant difference is that the EC not only has advisory power, but it can also sanction noncompliant members, whereas the CFT has advisory power only (Bakker 2013).

Table 1: The rule-based fiscal framework of the Euro Area and the monetary union of Curaçao and Sint Maarten

The Monetary union of Curaçao and Sint Maarten	Euro Area
<b>Rule-based fiscal framework</b>	
1. Kingdom Act	1. Maastricht Treaty (1992)
2. Constitution (“Staatsregeling”)	2. Stability and Growth Pact (1997)
3. Ordinance (“Landsverordening”)	3. Medium-term budgetary objective in national legislation
<b>Fiscal rules</b>	
1. Balanced current budget	1. Deficit-to-GDP ratio lower or equal to 3%
2. Borrow for capital investments only	2. Debt-to-GDP ratio lower or equal to 60%
3. Interest payments below 5% of government revenues in the previous three years	
<b>Fiscal council</b>	
Advisory power	
1. “College Financieel Toezicht”	1. European Commission
Sanctions power	
2. Instruction by the Kingdom Council of Ministers	2. Sanctions imposed by the European Commission
<b>Preventive arm</b>	
1. Positive advice from the CFT on the balanced budget	1. Positive advice from the European Commission on the balanced budget (i.e., medium-term budgetary objective)
2. Budget must be balanced in multiannual terms	2. Multiannual sustainability check
3. Performance reports (“Uitvoeringsrapportages”)	3. Early warnings
<b>Corrective arm</b>	
1. Advice from the CFT on supplementary budget	1. Advice from the European Commission on supplementary budget
2. Compensation of deficits in 3 years	2. Implement the Excessive Deficit Procedure if one of the fiscal rules is violated

Source: Bakker 2013 and the author’s point of view

<sup>30</sup> These borrowing rates thus reflect the triple-A rating of the Dutch government and not the higher sovereign risks of Curaçao and Sint Maarten.

## 2.4.2 Fiscal Rules in the Monetary Union of Curaçao and Sint Maarten

Before the constitutional reform effective 10 October 2010, the Social and Health Insurances Institution (“Sociale Verzekeringsbank” or SVB) of the Netherlands Antilles did not implement any measures to address its growing health care and pension costs because of the rapidly aging population. When the SVB of the Netherlands Antilles ceased to exist and a separate SVB was developed for Curaçao and Sint Maarten, each country became responsible for its social security system. Consequently, Curaçao was confronted with excessive health care and pension costs and insufficient financial resources to cover them. As a result, the government’s current budgets in 2010<sup>31</sup> and 2011 were unbalanced, contrary to what is stipulated by the Kingdom Act.<sup>32</sup> As the same result was expected for 2012, the CFT recommended that the Kingdom Council of Ministers issue an official instruction<sup>33</sup> to the Curaçao government to address the situation and, thereby, bring its budget back in balance.

Although the Curaçao government did not comply with all the requirements of the official instruction by the end of 2013, it did succeed in improving its public finances and, therefore, was allowed to borrow for the first time following its new constitutional status. However, the 2013 budget surplus had to be used to compensate for the budget deficits incurred over the period 2010-2012. In 2014, the Curaçao government complied with all the requirements of the official instruction, registered a balanced current budget, and compensated for all the deficits incurred in earlier years. The Curaçao government was able to borrow for the second time. In 2015 and 2016, Curaçao also complied with the golden budget rule and, as a result, was able to borrow. The implemented fiscal policy measures thus contributed positively to Curaçao’s public finances. The question that remains is whether the measures also have contributed positively to economic growth. The answer to this question will be dealt with in the next section.

## 3. Methodology

This section outlines the empirical approach to examine the impact of the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten on fiscal discipline and economic growth in Curaçao.<sup>34</sup> Fiscal rules are expected to positively impact fiscal discipline, consistent with existing empirical evidence. Under normal circumstances, fiscal rules also are expected to positively impact economic growth because fiscal discipline constitutes a prerequisite for economic growth (e.g. Castro 2011). If the government cannot comply with the fiscal rules and, hence, government measures must be implemented for compliance, then these measures can have a negative impact on economic growth. Fiscal rules de facto tie the hands of the government, preventing it from spending or investing freely in fostering economic growth (e.g. Manasan 2015).

### 3.1 Data

To estimate the impact of the fiscal rules on fiscal discipline and economic growth of Curaçao, multiple linear regression models have been constructed. Annual observations on the Curaçao government’s current budget balance, total budget balance, gross debt, and total expenditures were obtained from the Financial Management Reports of the government for the period 2001-2016.

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<sup>31</sup> The year 2010 refers to a short fiscal year running from 10 October 2010 to 31 December 2010.

<sup>32</sup> Sources for this section are CFT Jaarverslag 2013, Annual Report CBCS 2011-2013, IMF Country Report, 2014, and CFT advice reports 2013-2016.

<sup>33</sup> Note that the government of Sint Maarten received an official instruction from the Kingdom Council of Ministers in September 2015. However, the author will not elaborate on this matter as this paper focuses only on Curaçao.

<sup>34</sup> In this paper, the impact of the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten on fiscal discipline and economic growth is examined for Curaçao only because available data for Sint Maarten was not sufficient to construct a representative sample.

However, because Curaçao was part of the Netherlands Antilles before 10 October 2010, 75 percent of the fiscal data for the total central government of the Netherlands Antilles has been added to the Curaçao government data for the period 2001-2010.

Data on Curaçao's nominal GDP and CPI inflation were gathered from the Central Bureau of Statistics. Furthermore, data on the net inflows of Foreign Direct Investment (FDI) of Curaçao were taken from the balance of payments data of the CBCS. Global economic data were obtained from the IMF World Economic Database of October 2017. The sample period covers fifteen years, from 2002 to 2016, because of considerable constraints in data availability for certain variables.

## 3.2 Variables and Measurement

### 3.2.1 Dependent Variables

The dependent variables to be explained are fiscal discipline and economic growth in Curaçao. Fiscal discipline is defined as an improvement in the fiscal performance of Curaçao, which is calculated as the government's current budget balance, i.e., current revenues<sup>35</sup> minus current expenditures. The current budget balance is chosen as a proxy for fiscal performance as it reflects the golden budget rule in place in the monetary union of Curaçao and Sint Maarten. As stipulated in the Kingdom Act, the current budget balance should be balanced in multi-annual terms. Economic growth is defined as an improvement in the real GDP growth rate of Curaçao, which is computed as the difference in the natural logarithm of GDP at constant 2010 Netherlands Antillean guilders.

### 3.2.2 Explanatory Variables

The presence of fiscal rules is estimated by two fiscal rules dummies. The first dummy takes a value of 1 from 2010 to 2016 and a value of 0 in the period before 2010. The second dummy takes a value of 1 from 2011 to 2016 and a value of 0 in the period before 2011 as the fiscal rules were formally adopted in the monetary union of Curaçao and Sint Maarten after the dissolution of the Netherlands Antilles on 10 October 2010. In addition to the fiscal rules dummies, control variables were included in the regression models to limit omitted variables bias. The control variables depend on the model specification as shown in the next section.

An interesting control variable used is a proxy for creative accounting. The presence of fiscal rules in a monetary union can prompt national governments to use creative accounting as a way to avoid violating the rules (Milesi-Ferretti 2004).<sup>36</sup> Von Hagen and Wolff (2006) suggest that stock-flow adjustments can be used as a proxy for creative accounting. Stock-flow adjustments comprise the difference between the change in gross government debt and the total budget balance. These stock-flow adjustments have been perceived as random residuals generated mainly from financial operations, which should cancel out over time (European Commission 2003). However, Von Hagen and Wolff (2006) demonstrate that stock-flow adjustments can be systematically applied by governments as creative accounting.

The basic formula for gross government debt is the following (Maltritz and Wüste 2015):

$$D_t = D_{t-1} + B_t$$

$$0 = D_t - D_{t-1} - B_t$$

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<sup>35</sup> Current revenues include tax and nontax revenues.

<sup>36</sup> This behavior was the case in Greece as discussed in section 2.3.2.

This formula shows that  $D_t$ , i.e., the government's gross debt at time  $t$ , must be equal to  $D_{t-1}$ , the government's gross debt at time  $t - 1$ , plus  $B_t$ , the government's budget deficit at time  $t$ . In practice, this formula does not always hold because of stock-flow adjustments<sup>37</sup> create a residual:

$$SFA_t = D_t - D_{t-1} - B_t$$

### 3.3 Empirical Approach

#### 3.3.1 Fiscal Rules and Fiscal Discipline

To examine the impact of the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten on the fiscal discipline of the Curaçao government, the following equations were used:

$$CurrBal_t = \alpha_0 + \alpha_1 FRdum_t + \alpha_2 CurrBal_{t-1} + \alpha_3 \frac{SFA_t}{GovExp_t} + \varepsilon_t \quad [1]$$

$$CurrBal_t = \alpha_0 + \alpha_1 FRdum_t + \alpha_2 CurrBal_{t-1} + \alpha_3 \frac{SFA_t}{GovExp_t} + \alpha_4 \frac{SFA_t}{GovExp_t} * FRdum_t + \varepsilon_t \quad [2]$$

The first equation explains the government's current budget balance at time  $t$  ( $CurrBal_t$ ) by regressing it on a fiscal rules dummy at time  $t$  ( $FRdum_t$ ), the government's current budget balance at time  $t - 1$  ( $CurrBal_{t-1}$ ), and a proxy for creative accounting ( $\frac{SFA_t}{GovExp_t}$ ), calculated as the stock-flow adjustment at time  $t$  as a percentage of total government expenditures at time  $t$  as applied by Maltritz and Wüste (2015). Also,  $\delta_0$  stands for the intercept and  $\varepsilon_t$  is the error term. This model aims to examine what impact the fiscal rules have had on the Curaçao government's current budget balance and if creative accounting was present.

The second equation extends the previous equation by adding an interaction term to examine whether the presence of fiscal rules has prompted the Curaçao government to use creative accounting (see table 2).

Table 2: The expected impact of the explanatory variables in the first and second equations

Explanatory variable	Sign	Explanation of impact on $CurrBal_t$
$CurrBal_{t-1}$	(+)	This variable reflects the government's current budget balance in the previous year and is expected to impact the current budget balance in the next year positively.
$FRdum_t$	(+)	The sign is expected to be positive because the presence of fiscal rules should impose fiscal discipline on the government and positively impact the current budget balance.
$\frac{SFA}{GovExp}_t$	(+)	This variable is expected to have a positive impact on the current budget balance because it estimates creative accounting.
$\frac{SFA}{GovExp}_t * FRdum_t$	(+)	The presence of fiscal rules is expected to prompt the government to use creative accounting, meaning that the presence of rules is expected to have a positive impact on the government's current budget balance.

Source: the author's point of view based on economic theory and literature

<sup>37</sup> According to Von Hagen and Wolff (2006), positive stock-flow adjustments suggest that the government debt increased at a faster pace than reflected by the reported deficit (or decreased less than the reported government surplus). In other words, higher stock-flow adjustments lower the deficit or expand the government surplus. Consistently positive stock-flow adjustments can be the result of capital injections, transactions in financial assets, investments in government-owned companies, and other factors.

Specific variables were included in the initial models but dropped after they generated insignificant results. The primary variables dropped were a ratio of the 65+ population to total population, an election dummy, and the real GDP growth rate of Curaçao. As Krogstrup and Wälti (2008) suggest, a ratio of the 65+ population to total population was included to account for the aging of Curaçao's population as pensions are paid in part by the government. Thus, the higher the share of retired people, the higher the burden on the government's budget. Following Maltritz and Wüste (2015), an election dummy<sup>38</sup> was included because governments tend to increase spending during election years. In addition, the real GDP growth rate of Curaçao was included as a proxy for the economic state of the country because in prosperous economic times, the government may more easily achieve a balanced budget or budget surplus in line with the golden budget rule, while in weak economic times government spending increases in trying to stabilize the economy (Maltritz and Wüste 2015).

### 3.3.2 Fiscal Rules and Economic Growth

To investigate the impact of the rule-based fiscal framework in the monetary union of Curaçao and Sint Maarten on economic growth in Curaçao, the following equations were used:

$$\Delta \ln GDP_t = \delta_0 + \delta_1 FRdum_t + \delta_2 \frac{SFA_t}{GovExp_t} + \delta_3 GlobGrowth_t + \delta_4 \frac{FDI_t}{GDP_t} + \varepsilon_t \quad [3]$$

$$\Delta \ln GDP_t = \delta_0 + \delta_1 FRdum_t + \delta_2 \frac{SFA_t}{GovExp_t} + \delta_3 GlobGrowth_t + \delta_4 \frac{FDI_t}{GDP_t} + \delta_5 \frac{SFA_t}{GovExp_t} * FRdum_t + \varepsilon_t \quad [4]$$

The third equation explains the real GDP growth rate of Curaçao at time  $t$  ( $\Delta \ln GDP_t$ ) by regressing it on a fiscal rules dummy at time  $t$  ( $FRdum_t$ ), a proxy for creative accounting ( $\frac{SFA_t}{GovExp_t}$ ), the global GDP growth rate at time  $t$  ( $GlobGrowth_t$ ), and the net inflows of FDI at time  $t$  as a percentage of the nominal GDP of Curaçao at time  $t$  ( $\frac{FDI_t}{GDP_t}$ ). Furthermore,  $\delta_0$  is the intercept and  $\varepsilon_t$  is the error term.

The fourth equation extends the previous equation by including the same interaction term as applied to equations (1) and (2). Both equations aim to examine whether the presence of fiscal rules has negatively affected the real GDP growth rate of Curaçao (see table 3).

Table 3: The expected impact of the explanatory variables in the third and fourth equations

Explanatory variable	Sign	Explanation of impact on $\Delta \ln GDP_t$
$FRdum_t$	(-)	Despite the presence of fiscal rules, Curaçao has been experiencing sluggish economic growth for many years. <sup>39</sup> The presence of fiscal rules is expected to have a negative impact on the real GDP growth of Curaçao because the government's hands are tied, preventing it from spending/investing freely to stimulate economic growth.
$\frac{SFA_t}{GovExp_t}$	(+)	This variable is expected to have a positive impact on Curaçao's real GDP growth because creative accounting should lower the actual deficit, thereby pointing to fiscal discipline.
$\frac{SFA_t}{GovExp_t} * FRdum_t$	(+)	Fiscal rules are expected to prompt the Curaçao government to use creative accounting to stimulate economic growth.
$GlobGrowth_t$	(+)	The sign is expected to be positive because better global economic conditions are expected to contribute positively to the balance of payments of Curaçao and, hence, to its real GDP growth.
$\frac{FDI_t}{GDP_t}$	(+)	The sign is expected to be positive because an increase in the net inflows of foreign direct investments as a percentage of nominal GDP is expected to contribute positively to the real GDP growth of Curaçao.

Source: the author's point of view based on economic theory and literature

<sup>38</sup> The election dummy takes a value of 1 if an election took place in a particular year and 0 if not.

<sup>39</sup> The average real GDP growth was -0.3% for the period 2010-2016 and -0.4% for the period 2011-2016.

The global GDP growth rate also was replaced in the analyses by a constructed GDP growth rate based on the share in the balance of payments of Curaçao's main trading partners: the United States, the Netherlands, and Venezuela. However, the constructed GDP growth rate generated insignificant results. In addition, the GDP growth rate of the United States, the Netherlands, Venezuela, and an average for the Caribbean<sup>40</sup> was included separately and simultaneously instead of the global GDP growth rate. The GDP growth rates of the United States, the Netherlands, and the Caribbean showed a significant positive impact on the real GDP growth rate of Curaçao when they were included separately. Nonetheless, changes in the model specification did not matter; the impact of the fiscal rules on the real GDP growth rate of Curaçao remained negative.

### 3.3.3 Detecting multicollinearity

Multicollinearity occurs when one explanatory variable is highly correlated with one or more of the other explanatory variables in the regression model, meaning that these variables are measuring the same information (Paul 2006). In the case of high correlation, the regression results can become misleading, generating incorrect p-values, wide confidence intervals, and incorrect coefficients. To assess the degree of multicollinearity, the Variance Inflation Factors (VIF) were examined as follows:

$$VIF_j = \frac{SD_j^2(n-1)SE_j^2}{MSE^2}$$

Where  $SD_j^2$  is the squared standard deviation of the explanatory variable  $j$ ,  $SE_j^2$  is the squared standard error of the explanatory variable  $j$ ,  $n-1$  represents the number of degrees of freedom in the model, and  $MSE^2$  is the squared mean standard error of the residuals in the model.

To limit multicollinearity problems, especially in equations (2) and (4) caused by the interaction terms, the independent variable  $\frac{SFA_t}{GovExp_t}$  was mean-centered as recommended by Aiken and West (1991). As a result, the VIF values of all independent variables were below the threshold of 10.

## 4. Empirical results

All regression results are depicted in table 4.<sup>41</sup> In interpreting the results, note that the dependent variable, i.e., the Curaçao government's current budget balance, is defined positively, meaning that a positive value indicates a budget surplus and a negative value indicates a budget deficit. The first column shows that all coefficients are significant and have the expected sign. The fiscal rules dummy has a significant positive impact on the Curaçao government's current budget balance, implying that the presence of fiscal rules triggers a reduction in the government's current budget deficit. Also, the stock-flow adjustments exhibit a significant positive sign, suggesting that they reduce the government's current budget deficit. This result is expected and in line with existing literature, such as Von Hagen and Wolff (2006) and Milesi-Feretti (2004) because positive stock-flow adjustments suggest a lower budget deficit than projected based on a particular change in the government's gross debt. The third column shows that the inclusion of an interaction term does not change the results for most of the previously discussed variables; they remain significant and carry the expected sign. Nevertheless, the stock-flow adjustments become insignificant, and an insignificant joint influence is observed for the fiscal rules and the stock-flow adjustments. This finding indicates that the presence of fiscal rules does not seem to prompt the Curaçao government to apply creative accounting, contrary to empirical research carried out for the EU (Maltritz and Wüste 2015).

<sup>40</sup> The Caribbean consists of Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Dominican Republic, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.

<sup>41</sup> This section discusses only the variables of primary concern.

The second column presents the regression results when the first fiscal rules dummy, taking a value of 1 for the period 2010-2016, is replaced by the second dummy, taking a value of 1 for the period 2011-2016. The positive impact of the fiscal rules and the stock-flow adjustments remains the same. The fourth column indicates that by adding an interaction term, though the stock-flow adjustments remain significant, the joint influence of the fiscal rules and the stock-flow adjustments again is insignificant. Instead of prompting the Curaçao government to use creative accounting, the presence of fiscal rules in the monetary union of Curaçao and Sint Maarten seems to limit it.

Almost all coefficients in the other columns (columns 5-8) display the expected sign, while the significance of the coefficients depends on the model specification. However, the variable of primary concern, namely, the fiscal rules dummy, maintains a significant negative sign despite changes in the model specification. Apparently, the presence of fiscal rules contributes negatively to the real GDP growth rate of Curaçao. This result is expected as discussed in section 2.3.1 because fiscal rules generate fiscal discipline for the members of a monetary union, but sometimes at the expense of economic growth. As expected, the contribution of stock-flow adjustments to growth is positive as these can reflect, for example, capital injections that increase government spending to stimulate growth despite reporting a lower deficit. However, the magnitude of the impact is minimal and only significant when the second dummy is used. More importantly, the joint effect of the fiscal rules dummy and the stock-flow adjustments on real GDP growth is insignificant, suggesting that the presence of fiscal rules limits the use of creative accounting to foster growth.



Table 4: Multiple linear regression results a) b) c) d) e)

Dependent variable Equation	<i>CurrBal<sub>t</sub></i>				$\Delta \ln GDP_t$			
	[1]		[2]		[3]		[4]	
	A	B	A	B	A	B	A	B
Intercept	-82.020 (-3.347)***	-72.776 (-3.270)***	-78.151 (-2.730)**	-72.926 (-3.163)**	-0.028 (-3.645)***	-0.027 (-3.583)***	-0.026 (-2.776)**	-0.027 (-3.426)***
<i>FRdum</i> <sub>2010<sub>t</sub></sub>	128.084 (3.463)***		125.076 (3.136)**		-0.009 (-2.599)**		-0.007 (-1.880)*	
<i>FRdum</i> <sub>2011<sub>t</sub></sub>		126.254 (3.558)***		136.622 (3.243)***		-0.009 (-2.782)**		-0.009 (-2.484)**
$\frac{SFA}{GovExp_t}$	1.202 (3.643)***	0.698 (2.267)**	0.978 (1.192)	0.733 (2.245)**	4.22E-05 (1.380)	7.75E-05 (2.745)**	1.30E-04 (1.070)	7.64E-05 (2.566)**
$\frac{SFA}{GovExp_t} * FRdum_{2010_t}$			0.269 (0.301)				-1.02E-04 (-0.603)	
$\frac{SFA}{GovExp_t} * FRdum_{2011_t}$				-1.099 (-0.504)				4.83E-05 (0.255)
<i>CurrBal</i> <sub>t-1</sub>	0.295 (2.388)**	0.292 (2.399)**	0.299 (2.306)**	0.272 (2.059)*				
$\frac{FDI}{GDP_t}$					0.004 (3.614)***	0.005 (3.816)***	0.005 (2.614)**	0.005 (3.656)***
<i>GlobGrowth</i> <sub>t</sub>					0.003 (2.701)**	0.002 (2.273)**	0.002 (0.863)	0.002 (2.156)*
R-squared	0.733	0.741	0.735	0.747	0.758	0.771	0.772	0.773
Adjusted R-squared	0.660	0.670	0.630	0.646	0.671	0.688	0.658	0.659
F-statistic	10.068***	10.468***	6.949***	7.382***	8.631***	9.264***	8.540***	6.794***
Number of observations	15	15	15	15	15	15	15	15

Source: Author's calculations based on data gathered as discussed in section 3.

a) \*, \*\*, \*\*\* mean a coefficient significant at 10%, 5%, and 1% significance level.

b) T-statistics are reported in parentheses.

c) Davidson-MacKinnon (HC3) heteroscedasticity-consistent standard errors and covariance were used for the model (4A).

d) *FRdum*<sub>2010<sub>t</sub> takes a value of 1 for the period 2010-2016 and zero otherwise, while *FRdum*<sub>2011<sub>t</sub> takes a value of 1 for the period 2011-2016 and zero otherwise.</sub></sub>

## 4.1 Robustness checks

### 4.1.1 Detecting stationarity

Nonstationary variables cause regression models to generate spurious results (Nielsen 2005). To avoid this problem, the following Augmented-Dickey Fuller (ADF) test was used to check the order of integration of the time series.

The ADF test has three possible forms as shown in the following equations:

$$\text{With trend and intercept: } \Delta y_t = \alpha + \gamma T + \delta y_{t-1} + \sum_{i=1}^p \phi_i \Delta y_{t-i} + \epsilon_t$$

$$\text{With intercept and no trend: } \Delta y_t = \alpha + \delta y_{t-1} + \sum_{i=1}^p \phi_i \Delta y_{t-i} + \epsilon_t$$

$$\text{With intercept and no trend: } \Delta y_t = \delta y_{t-1} + \sum_{i=1}^p \phi_i \Delta y_{t-i} + \epsilon_t$$

Where  $y_t$  is the (in)dependent variable,  $\alpha$  is the constant,  $T$  is the trend,  $y_{t-1}$  is the lagged (in)dependent variable,  $p$  is the lag parameter,  $\epsilon_t$  is the error term, and  $\Delta$  is the first difference operator. The lag parameter ( $p$ ) was determined according to the Schwarz Information Criterion (SIC) and the critical values from MacKinnon (1996) were used.

Using the approach of Dolado, Jenkinson and Sosvilla-Rivero (1990), the presence of unit roots was tested as shown in appendix 1. The ADF test results indicate that the null of nonstationarity can be rejected in levels, meaning that all series are stationary (see table 5).

Table 5: Sequential unit root test results at levels <sup>a)</sup>

Variable	Trend and intercept	Intercept and no trend	No intercept and no trend	Order of integration
$\Delta \ln GDP_t$	-2.538	-1.695	-1.767*	I(0)
$CurrBal_t$	-3.481*	--	--	I(0)
$CurrBal_{t-1}$	-3.281	-3.162**	--	I(0)
$\frac{SFA}{GovExp}_t$	-2.997	-3.001*	--	I(0)
$\frac{FDI}{GDP}_t$	-3.804*	--	--	I(0)
$GlobGrowth_t$	-3.351*	--	--	I(0)

Source: Author's calculations based on data gathered as discussed in section 3.

<sup>a)</sup> \* and \*\* mean the statistic is significant at 10% and 5% significance level.

### 4.1.2 Linearity

A multiple linear regression model implicitly assumes that the dependent variable is a linear function of the explanatory variables (Darlington 1968). However, if the linear relationship is not present, the regression coefficients, standard errors, and significance tests may be biased (Keith 2006). The Ramsey RESET test can be used to assess the functional form of a regression model (Ramsey 1969), thereby adding higher-order terms of fitted values to the initial model and examining whether the added values are equal to zero.<sup>42</sup> The Ramsey RESET test results indicate that the null hypothesis of linearity cannot be rejected, suggesting that the models are correctly specified (see table 6).

<sup>42</sup> When using the Ramsey RESET test, the choice for the number of fitted terms is subjective. However, including a large number of fitted terms may cause the added values to become highly collinear.

### 4.1.3 Homoskedasticity

Homoskedasticity occurs when the residuals in a model have equal variance across all levels of the explanatory variables (Osborne and Waters 2002). Berry and Feldman (1985) and Tabachnick and Fidell (1996) argue that some heteroskedasticity, i.e., the opposite of homoskedasticity, is not a cause for significant concern, but significant heteroskedasticity can weaken the model's findings. The Breusch-Pagan-Godfrey and the White tests can be used to assess homoskedasticity. Both test results show that the null hypothesis of homoscedasticity cannot be rejected (see table 6).

### 4.1.4 Zero autocorrelation

Autocorrelation occurs when residuals are not pairwise independent, meaning that time series correlate with their past and future values (Anderson 1942). Autocorrelation reduces the number of independent observations and invalidates the general significance tests. The Durbin Watson (DW) and the Breusch-Godfrey (BG) tests are used. A DW value near 2 means zero autocorrelation, a value toward 0 means positive autocorrelation, and a value toward 4 means negative autocorrelation. The BG test runs a regression with the residuals at time  $t$  ( $\varepsilon_t$ ) as a function of the explanatory variables and the residuals at time  $t - 1$  ( $\varepsilon_{t-1}$ ). Both test results suggest that the null hypothesis of zero autocorrelation cannot be rejected (see table 6).

### 4.1.5 Normality

Another assumption of a linear regression model is that residuals ( $\varepsilon_t$ ) are independent and identically distributed following a normal distribution with zero mean and variance  $\sigma^2$ . To test for normality, the Jarque-Bera (JB) test (Bera and Jarque 1982) is used.

The JB test statistic is defined as follows:

$$JB = \frac{n}{6} \left( S^2 + \frac{K^2}{4} \right)$$

Where  $S$  denotes the sample skew,  $K$  is the sample excess kurtosis, and  $n$  is the number of observations. The JB test statistic has an asymptotic Chi-square distribution with 2 degrees of freedom.<sup>43</sup> The JB test results show that the null hypothesis of normally distributed residuals cannot be rejected (see table 6).

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<sup>43</sup> For small samples, one should interpret these results carefully as the Chi-square approximation becomes sensitive and can reject the null hypothesis when it is true.

Table 6: Robustness test results <sup>a) b)</sup>

Dependent variable Equation	<i>CurrBal<sub>t</sub></i>				$\Delta \ln GDP_t$			
	[1] A	B	[2] A	B	[3] A	B	[4] A	B
4.1.1 Linearity								
A. Ramsey RESET test with one fitted term								
t-statistic	0.452	0.236	0.564	0.006	0.162	0.069	0.026	0.003
Probability	0.661	0.818	0.587	0.996	0.875	0.947	0.980	0.998
B. Ramsey RESET test with two fitted terms								
F-statistic	0.199	0.300	0.303	0.258	0.027	0.062	0.098	0.144
Probability	0.823	0.748	0.747	0.779	0.974	0.940	0.908	0.868
4.1.2 Homoskedasticity								
A. Breusch-Pagan-Godfrey test								
F-statistic	0.027	0.042	0.123	0.053	0.719	1.009	1.058	0.728
Probability	0.994	0.988	0.971	0.994	0.596	0.444	0.438	0.618
Obs*R-squared	0.109	0.171	0.701	0.310	3.318	4.295	5.535	4.269
Probability	0.991	0.982	0.951	0.989	0.506	0.368	0.354	0.511
B. White test								
F-statistic	0.448	0.371	0.880	0.298	0.512	0.824	0.780	0.648
Probability	0.723	0.776	0.510	0.873	0.729	0.537	0.586	0.670
Obs*R-squared	1.635	1.378	3.904	1.598	2.511	3.688	4.489	3.917
Probability	0.652	0.711	0.419	0.809	0.643	0.450	0.481	0.562
4.1.3 Autocorrelation								
A. Durbin Watson test								
	1.782	1.905	1.810	1.995	2.155	2.197	2.152	2.241
B. Breusch-Godfrey test								
F-statistic	0.116	0.006	0.064	0.005	0.109	0.167	0.094	0.221
Probability	0.740	0.939	0.806	0.948	0.748	0.692	0.767	0.650
Obs*R-squared	0.172	0.009	0.106	0.008	0.173	0.262	0.165	0.383
Probability	0.678	0.924	0.745	0.931	0.678	0.609	0.685	0.536
4.1.4 Normality								
A. Jarque-Bera test								
	0.623	2.019	1.020	2.676	0.846	0.936	0.640	1.023
Probability	0.732	0.364	0.600	0.262	0.655	0.626	0.726	0.600

Source: the author's calculations based on data gathered as discussed in section 3.

<sup>a)</sup> All robustness test results are insignificant at 1% significant level.

<sup>b)</sup> The Breusch-Godfrey test was performed for one lag as annual time series were used in this study. However, two lags resulted in similar conclusions.

## 5. Conclusion

The experience of several countries with the financial crisis has highlighted the importance of fiscal discipline. Fiscal discipline is a prerequisite for sustainable economic growth, particularly crucial for monetary unions with a centralized monetary authority and decentralized fiscal authorities as individual members in these unions cannot apply monetary policy measures to adjust for country-specific shocks. Therefore, the role of national fiscal policies and fiscal discipline becomes crucial. Fiscal rules tend to be related to better fiscal performance and fiscal discipline but can be at the expense of economic growth.

This paper contributes to academic literature in two ways. First, the main lessons learned from the experience of the Euro Area with implementing its fiscal rules were discussed.

- A. Monetary union members should remain cautious, applying countercyclical fiscal policy measures to maintain a sound fiscal position, in particular, during weak economic times.
- B. The quality and completeness of government statistics are crucial.
- C. Monitoring compliance with the fiscal rules must be independent and supplemented by enforcement mechanisms, including sanctions.
- D. Macroprudential policy supported by automatic corrective mechanisms is required to improve the resilience of the macroeconomic system and smooth the financial cycle.
- E. When a monetary union experiences severe economic conditions, it should be able to implement escape clauses.
- F. A monetary union should have crisis resolution mechanisms in place in case of solvency crises to minimize contagion risks.

Second, this paper zoomed in on the monetary union of Curaçao and Sint Maarten to examine whether its rule-based fiscal framework has succeeded in generating fiscal discipline and economic growth in Curaçao. The results suggest that the presence of fiscal rules has had a significant positive impact on the Curaçao government's current budget balance, thereby contributing positively to fiscal discipline. Rather than prompting the government to use creative accounting, the presence of fiscal rules also seems to have limited the use of creative accounting by the Curaçao government. However, the fiscal rules have contributed negatively to Curaçao's real GDP growth, suggesting that the sole presence of fiscal rules—which generates fiscal discipline—is not sufficient to foster economic growth. Fiscal discipline needs to be complemented by the improvement of other areas in the macroeconomic environment.<sup>44</sup>

Regretfully, because of lack of data for Curaçao and especially for Sint Maarten, it was not possible to gather a larger sample size for Curaçao and include Sint Maarten in the analysis. Another limitation of this study is the assumption that 75 percent of the government data stemming from the central government of the Netherlands Antilles can be attributed to Curaçao in the period before 10 October 2010. Because the central government data represent data for all the former Netherlands Antillean islands,<sup>45</sup> it is possible that in certain years the assumption of 75 percent does not apply, i.e., the percentage corresponding to Curaçao might be either larger or smaller.

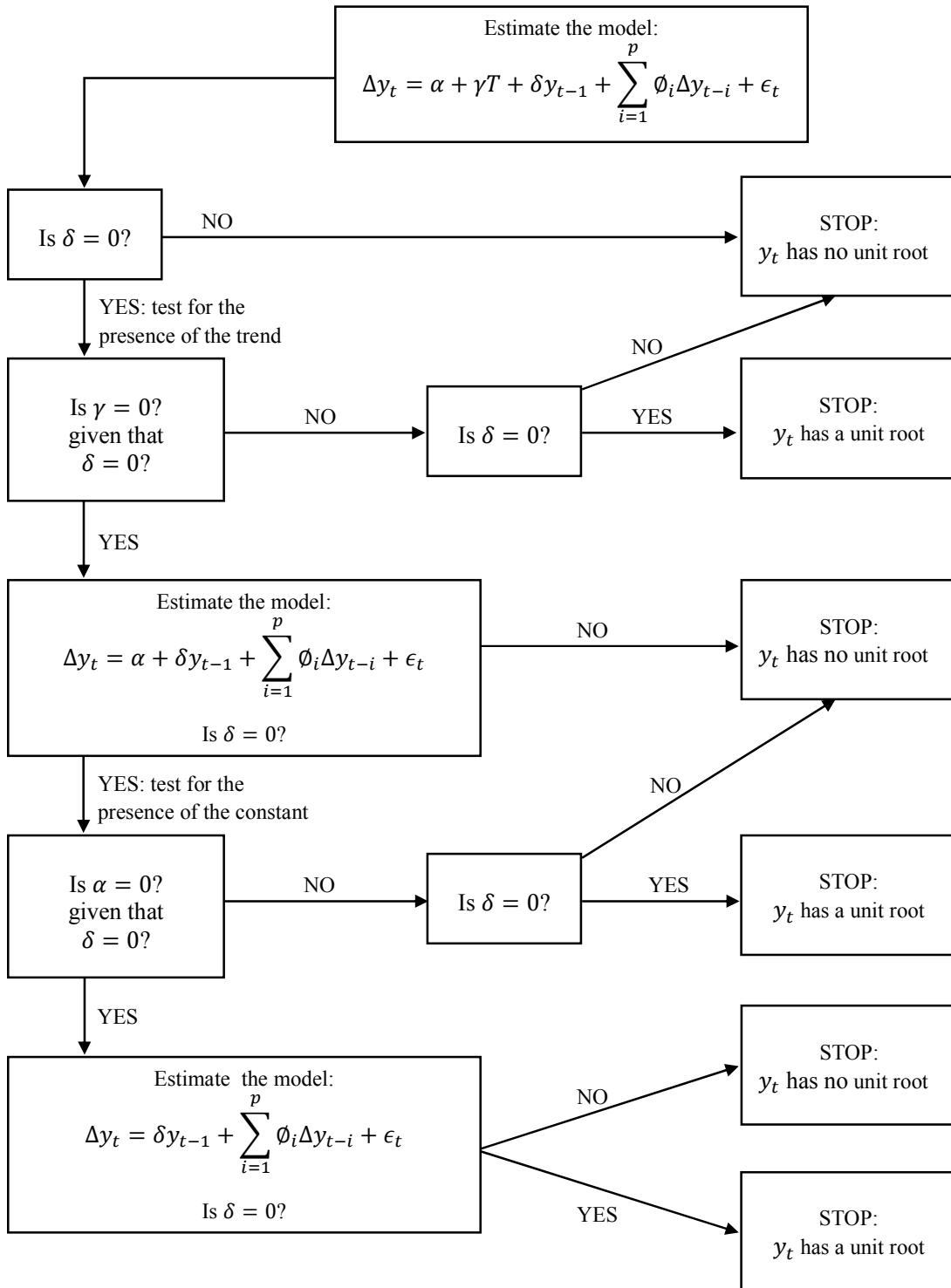
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<sup>44</sup> Other areas in the macroeconomic environment include, among other things, addressing the red tape, improving competitiveness, improving the investment climate, and mobilizing the labor market.

<sup>45</sup> The Netherlands Antilles consisted of Curaçao, Bonaire, Aruba, Sint Maarten, Saba, and Statia, though Curaçao's share in the Antilles was the largest.

Appendix

Appendix 1: Testing the presence of unit roots



Source: Adapted from Dolado, Jenkinson and Sosvilla-Rivero (1990)

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