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**STRUCTURAL BUDGET BALANCE:
A STUDY OF THE CYCLE AND THE PRIMARY ACCOUNTS OF
RIO GRANDE DO SUL STATE (BRAZIL) FROM 1999 TO 2015**

SÃO LEOPOLDO

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Bruno Pedron

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Dissertação apresentada como requisito parcial
para obtenção do título de Mestre em
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Orientador: Prof. Dr. Igor Alexandre Clemente de Moraes

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ABSTRACT

The aim of this study is to understand the relation between the business cycle and the primary result of Rio Grande do Sul. For that reason, monthly data were collected from the Real-time public finances tool of the state finances office for the period of 1999-2015, which allowed for the calculation of the quarterly primary result without intra-budget operations. These data were adjusted for inflation by IPCA and seasonality by multiplicative Census X-13 and then used to run the International Monetary Fund (IMF) approach of the structural budget balance. The transfers from the federal government were removed from the regression and the elasticity of revenue to the output was estimated through an autoregressive model and resulted in 1.0908, while the potential GDP was obtained through the Christiano-Fitzgerald filter. No adjustments were applied to the expenditures or the transfers. The results pointed out that Rio Grande do Sul is more likely to be operating above trend GDP and taking actions of fiscal contraction, although working harder during phases of expansion. Thus, pro-cyclical policies were conducted on 75% of the years of the sample. When the political cycles were analyzed, it turned out only the cycle of governor Yeda Crusis (2007-2010) had a counter-cyclical bias. Overall, the state is aligned with the cyclicity of the federal government, even though half of the periods that were compared to the findings of Andreis (2014) displayed opposite fiscal stances. In the end, some suggestions were made for fiscal contractions, inspired by Santos (2014).

Key-words: Structural balance. Business cycle. Output gap. Fiscal policy. Sub-national.

RESUMO

O objetivo deste trabalho foi compreender a relação entre o ciclo de negócios e o resultado primário do Rio Grande do Sul. Para tanto, foram coletados dados mensais da Ferramenta de finanças públicas em tempo real da Secretaria da Fazenda do estado para o período de 1999-2015, os quais conduziram ao cálculo do resultado primário trimestral sem operações intraorçamentárias. Estes dados foram ajustados pela inflação pelo IPCA e pela sazonalidade utilizando o Census X-13 multiplicativo, e então foram utilizados para estimar o balanço orçamentário estrutural pela abordagem do Fundo Monetário Internacional. As repartições de receitas da União e as transferências diversas foram removidas da regressão e a elasticidade das receitas em relação ao PIB foi estimada através de um modelo autorregressivo, resultando em 1,0908, enquanto o PIB potencial foi obtido pelo uso do filtro Christiano-Fitzgerald. Nenhum ajuste foi aplicado às despesas ou às transferências da União. Os resultados mostraram que o Rio Grande do Sul está mais predisposto a operar acima do PIB potencial e promovendo contrações fiscais, apesar de mostrar mais esforços nas fases de expansão. Assim, foram encontradas políticas pró-cíclicas em 75% dos anos da amostra. Quando os ciclos políticos foram analisados, apenas o ciclo da governadora Yeda Crusius (2007-2010) apresentou-se de forma anti-cíclica. De forma geral, o estado está alinhado à ciclicidade do governo federal, mesmo considerando que, metade dos períodos que foram comparados com Andreis (2014) apresentaram políticas opostas às estimadas. Finalmente sugestões foram dadas para o estado na forma de contrações fiscais, inspirado em Santos (2014).

Palavras-chave: Balanço estrutural. Ciclo de negócios. Hiato do produto. Política fiscal. Subnacional.

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LIST OF ACRONYMS

ADL	Autoregressive distributed lag
ARP	Anulação de restos a pagar
BCB	Banco Central do Brasil
CAGE	Contadoria e Auditoria-Geral do Estado
CF	Christiano-Fitzgerald
DETRAN	Departamento Estadual de Trânsito do Rio Grande do Sul
DSGE	Dynamic stochastic general equilibrium
ECB	European Commission Bank
FEE	Fundação de Economia e Estatística Siegfried Emanuel Heuser
FPE	Fundo de Participação dos Estados
FUNDEB	Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação
GDP	Gross domestic product
HP	Hodrick-Prescott
IBCR	Índice de Atividade Econômica Regional
IBGE	Instituto Brasileiro de Geografia e Estatística
ICMS	Imposto sobre circulação de mercadorias e serviços
IMF	International Monetary Fund
IPEA	Instituto de Pesquisa Econômica Aplicada
IPI	Imposto sobre Produtos Industrializados
IPVA	Imposto sobre a Propriedade de Veículos Automotores
ITCD	Imposto sobre Transmissão Causa Mortis e Doação
LDO	Lei de Diretrizes Orçamentárias
LOA	Lei Orçamentária Anual
OECD	Organization for Economic Co-operation and Development
PPA	Plano Plurianual
RGPS	Regime Geral de Previdência Social
RPPS	Regime Próprio de Previdência Social
RREO	Relatório Resumido da Execução Orçamentária
SBB	Structural budget balance
SEFAZ	Secretaria da Fazenda do Estado do Rio Grande do Sul

SUS Sistema Único de Saúde
SVAR Structural vector autoregressions

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1 INTRODUCTION

The fact that governments have major roles in economies is undeniable. Policymakers create laws for the well-being of the population and to ensure the continuous working of the public system. The Federal Constitution of Brazil represents this point, as the objectives of the republic are to build a free, fair and caring society, provide the national development, eradicate poverty and reduce the regional inequalities. (BRASIL, 1988). In order to reach these objectives, the government must manage its revenues and expenditures through the mechanisms of fiscal and monetary policies, while watching out for the effects of the business cycle over its accounts.

It is easy to deduce that, if a government spends more than it gets, it has a deficit, but the idea that having a deficit is not necessarily bad in the short run is thought-provoking. In the national accountability, the government expenditures increase aggregate demand and output. That doesn't mean the government can keep spending forever, since there is a debt sustainability problem: when it runs out of cash, it has to do financial transactions (borrow money from banks and other institutions under its control) or sell assets to be able to keep spending, but the borrowed money is subject to interest rates and, if not paid, the amount of interest will increase with time, rendering the debt unpayable in the long run. This high debt would harm not only the principles of efficiency determined by the Federal Constitution and economicity from the Constitution of the State of Rio Grande do Sul (RIO GRANDE DO SUL, 1989), but also the fiscal management principles imposed by the fiscal responsibility law (BRASIL, 2000), so it is necessary to study ways of maintaining the sustainability of the fiscal accounts. Mentioning this subject, the Central Bank of Brazil - Banco Central do Brasil (BCB) has an interesting time series on the net debt of the state government, which displays a constantly rising debt, except during the periods of 2009Q1-Q3 and 2012Q1. (BCB, 2016a). Moreover, the relation of these data to the annual GDP provided by the state's Institute of Economics Statistics – Fundação de Economia e Estatística (FEE), show that the net debt has been increasing from 2013 (15.98% of GDP) to 2015 (17.44%), representing 17.32% of GDP, on average, between 2007 and 2015¹.

In Brazil, each state has its own accounts and legal obligations, symbolizing the basis of autonomy of the states and their capacity to execute the services under their competence. These errands are defined by the federative pact of the Federal Constitution, which is specified

¹ Calculations of the author. The raw data are published at FEE (2016), in spreadsheets ranging from 1995-2010 and 2010-2015.

in many articles, by areas of public interest. Major decisions which define the course of the country are still centralized at the federal government, while the states get to deal with regional issues, and the municipalities with local activities. Yet, each sphere of government is allowed to help the other through financial transfers, since interfering with the obligations of each other without permission is not allowed (it would harm the principle of non-intervention set at articles 4 IV, 34 and 35 of the Federal Constitution). (BRASIL, 1988).

Therefore, states and municipalities have reached political, financial and fiscal autonomy within legal limits. Considering this scenario of decentralization, Romer (2012) raises the idea that, for random reasons, the regional effects of fiscal change may not be the same as the national effect. Therefore, this study ended pinpointing the differences across space that occur within the economy, speculating that it is possible that what happens in the national level is not the same as what happens in every region of the country, given this scenario of fiscal autonomy.

1.1 Limitations of the Study

This study focuses solely on the calculation of the structural budget balance of Rio Grande do Sul. It is possible to apply this methodology in any other states and compare the results with the national policy, as long as there are data available. The time period analyzed was set from 1999 to 2015, with monthly, quarterly and annual data, which are subject to the limitations of the databases used. The quarterly gross domestic product (GDP) of the state for 2016 has been released in a late date and the data prior to 1999 are too erratic.

1.2 Outline of the Problem

Assuming that fiscal policy in a regional level may not be identical to the policy at national level, it is important to study the fiscal accounts in this smaller level and check if it is correlated to the expectations of the federal government.

Therefore, based on these considerations, the following research question is asked:

What is the relation between the business cycle and the fiscal policy of the public administration of Rio Grande do Sul state?

1.3 Objectives

This study focuses on fiscal policy in a sub-national perspective. In order to reach conclusions on this area, the following objectives were pursued.

1.3.1 General Objective

Analyze the relation between the state's fiscal policy and the business cycle according to the output gap.

1.3.2 Specific Objectives

- a) analyze the revenues and expenditures of the state government, recognizing its fiscal autonomy;
- b) calculate the structural balance for the state in the period studied;
- c) verify the cyclicity of the state's fiscal policy;
- d) compare the state cyclicity with the federal results found by other authors.

1.4 Justification

Comparisons of this state against others are recurrent. Santos (2007) used data from 2005 to show that Rio Grande do Sul was the state with highest expenditures with payroll and benefits (65.8% of the net current revenue), inactive workers and pensioners (30.9%), had the highest financial liability, the second highest total liability (360.2%) and the lowest budget result (-7.1%), besides being the state with least investments. These data were then updated by Santos (2015), according to whom the state kept being the one with highest expenditures with inactive workers and pensioners (now 35.2% of the net current revenue) and became the most indebted state. These variables, followed by a forecast of negative budget results, and a total consumption of the judicial deposits, made the state the worst in the national ranking. (SANTOS, 2015).

Rio Grande do Sul has a history of difficulties in fiscal policy conducting. Busatto and Santos (2003), who studied the financial standing of the state government from 1998 to 2002, concluded that the public debt had risen and the fiscal crisis, which had been lasting three decades back then, had only been getting worse. Besides that, there was a certain skepticism regarding the fact that the short term net debt was bigger than what the government published.

In compliance with this scenario, data² from BCB (2016b) indicate that Rio Grande do Sul has had subsequent primary deficits in 2015, although presenting surpluses prior to this period, indicating a possible crisis. This situation went on with time and unleashed difficulties related to complying with legal obligations, such as the turmoil in the payment of the civil servants in the 2000's. Allied with this line of adversities, Morais (2013) studied the performance of this economy between 1991 and 2008 through the use of leading indicators in the industrial sector and found at least five recessions. This fact may be justified with the theories of the business cycles and the appearance of exogenous shocks and international crises, but this author explained that the state relies deeply in the performance of the agricultural sector and the industrial production. So, if there is a drought in the fields, the soybeans production, which is one of the top exported products, suffers deeply, as well as the meat production and corn and other vegetables. This cycle in production affects tax collection and the public budget, so it is interesting to study the role of the government during the downfalls.

For Ter-Minissian (2011), moments of uncertainty, risk and turmoil are not ideal for the implementation of structural balance-based fiscal rules, but that doesn't mean one can't study the past and plan to use it in the future. When this downfall phase of the cycle is over, it will be the right moment to change the fiscal rules and reduce the shortcomings of future downfalls of the economy.

Last but not least, what is the contribution of this study to the literature? The scope here is not only to demonstrate how important fiscal policy can be to the development of society, but to generate statistics and ideas for the policymakers about the past and prepare them for the future. When the subject is the government, it is hard to actually see the results being implemented due to political forces and lack of commitment (TER-MINISSIAN, 2011). Planning is of utmost importance in any economy, thus providing means to plan for the future is a good way to bet on development. Furthermore, this study attempted to encourage the research in fiscal policy for the sub-national level, which is imperative, but hard to conduct. Although it used the state level, it can be used as an inspiration for local researches, as the method chosen can be replicated for any geographical area, as long as the data are compatible. The following sections will discuss the concepts and ideas inert to the area of fiscal policy and the business cycles, going through a review of the literature, explaining the methodology used and finishing with the analysis of the data collected and estimates.

² These data refer to the need of funding, which is interpreted the following way: if the sign is positive, then the state had a need for borrowing, therefore it had a primary deficit.

2 REVIEW OF THE LITERATURE

In order to make a credible research, it is necessary to look at what knowledge has been produced in the area that is being studied and understand the contribution of the various authors. This part of the research is dedicated to the working mechanism of the business cycles, the fiscal budget and the fiscal policy in Brazil. It is also dedicated to the compilation of empirical studies results, as it is important to analyze how the theory is being implemented in real life.

2.1 The Business Cycles and the Governmental Actions

Economies cannot grow forever, this is a well-known fact. Whereas growth restriction can be estimated through a series of models, this is not the aim of this study. Actually, what is being sought here is to analyze what happens along the way, since growth does not occur equally with the passing of the time. The theory of the cycles has been studied by many economists, such as Kalecki (1977), Keynes (1996), Schumpeter (1997) and others, but the focus of this study is neither debating the history of the cycles nor trying to explain why they happen, but to solely understand their effects at the general economy and, specially, at the fiscal policy. They happen naturally, but the governments can have influence over them.

Economies are subject to cycles, which are conducted through changes in their growth rates, as stated by Mintz (1969). This rate doesn't have to be negative to show a recession, since it can be positive but still under the trend value. Morais (2013) recaps a rule of thumb for identifying recessions in an economy, which is to find two consecutive periods of reduction in GDP. Both authors seem to agree in one point, though: it is not correct to focus the analysis of the cycles on a single sector of the economy. For example, while the Brazilian industrial sector may be going through a recession, the agricultural and mining sectors may be undergoing a growth, so the final result may be difficult to forecast. This issue may even lead an opening to discuss the Dutch disease, as did Frankel (2011a): if these commodity sectors rely less on labor and more on land, then a boom in these sectors will not only cause unemployment, but inflation as well. Since unemployment is a major variable used in the analysis of cycles, its increase will impact macroeconomic variables and change the output, demanding governmental action towards the fate of the output. (BUDNEVICH, 2002).

These concepts raise thoughts about the trend of growth of an economy, which appears in the long run. An economy can go through four states: first there is an **expansion** time in which GDP increases, until it reaches its **peak** and starts a contraction moment (slower growth),

which may turn into a **crisis** and lead to the **depression**, the bottom (trough) of the growth line. It is easier to think of these movements as waves around a linear trend line, which may either be plain (set at zero) or with a positive inclination, signaling the growth expectations of the economy. So, it is important to remember these four phases and to know what the literature of business cycles names as turning points of the growth rate.

Frankel (2011a) agrees that the cycles are natural movements of the economy, so there is no way of avoiding them, although their impacts can be reduced when the government uses the mechanisms of fiscal and monetary policies. In Brazil, the monetary policy is determined by the federal government, in accordance to article 22, VI of the Federal Constitution, and since this study focuses on the state level perspective, it will not be discussed. On the other hand, the states have freedom to legislate in some aspects of fiscal policy, that is, they have autonomy over their expenditures and revenues, the power to modify the taxes within their jurisdiction and even to elect their own representatives (governors and congressmen). With that said, one may notice that the government has a certain power to choose the destination of the cycle, if the peaks and troughs should be closer or further from the central tendency. This power is derived from the effects of the policies on the cycle: if a policy is pro-cyclical, it will move the peaks and troughs away from the trend, while a counter-cyclical policy does the opposite, reducing the standard deviation. Examples of a counter-cyclical policy in an expansion phase, by Rodriguez, Tokman and Vega (2007), could be reduction of governmental expenditures, increasing taxes, increase public saving and making a budget surplus. It is quite easy to understand the logic behind this: during the expansion, it is expected that GDP will grow because of the well-state of the economy, so, if the government wished to keep it from growing too much and overheating the economy, it may make use of these counter-cyclical tools. The opposite can be done during a recession, when the government will work to restore GDP, in an attempt to save the country.

The great question is: should the policies be more pro or counter-cyclical? Ter-Minissian (2011), as an avid defender of the counter-cyclical policies, explained that fighting pro-cyclicality helped to achieve macroeconomic stability, long term fiscal sustainability and social costs efficiency. The problem of defending this point of view is the lack of political support: political forces are usually greedy and focus on increasing output at any cost. During a growth phase, the fiscal accounts would naturally get better due to the increase of fiscal revenues, but the government does not resist the urge to spend that surplus to increase demand and, consequentially, the output. Yet, Rodriguez, Tokman and Vega (2007) showed that it is possible surpass this barrier and get the support required to start making counter-cyclical policies, which is what

happened in Chile. Until 2006, the structural surplus was not a legal obligation imposed to the Chilean government; still, it had been a worry to the government since 2001. With the help of a committee of independent experts, the government was able to start making counter-cyclical policies, which revolved around saving in good times and spending in bad ones. This came along with the creation of funds, such as the Pension Reserve Fund, and the Economic and Social Stabilization Fund, which shared the idea of saving during the boom phase of the cycle, when the copper prices were high and the government was having high fiscal revenues from exports. Finally, there is Frankel (2011b, p. 3), who also did this discussion about the political pressure upon fiscal policy and how Chile was able to surpass it, saying that “It has beaten the curse of procyclicality via the innovation of a set of fiscal institutions that are designed to work even in a world where politicians and voters are fallible human beings rather than angels”. This author then adds that developing countries are more likely to make pro-cyclical fiscal rules, as they are more susceptible to exogenous shocks that change the export commodities prices, to macroeconomic and political instabilities and to the pro-cyclical capital flows.

With these arguments taken, it is understandable that counter-cyclical fiscal policy should be the right way to go. This affirmative is not wrong, as this action seeks to reduce instability in the economy. However, it is hard to keep the same kind of policy through time, as the political pressure and the fiscal sustainability can lead to a change of course.

Bringing in the concepts of cycles closer to the reality, Santos (2014) managed to make a link between supply, demand and the cycles: the first one determines the long term growth capacity of the economy, while the second one manages the growth around this trend, leading to the cycles, which emanate from economic growth based on GDP. This author goes on, saying that the economy of Rio Grande do Sul is heavily dependent agricultural commodities (nearly 40% of its GDP came from the agribusiness) to the point that droughts can generate a chain reaction of downturns, as the this sector would reduce the availability of agricultural inputs to the industrial sector, thus reducing the supply of industrialized goods, the demand for transport services and, lastly, demand and income. However, these droughts can be foreseen and producers can ask for governmental help. These movements must be included in the public planning of revenues and expenditures, which is formally known as the public budget.

2.2 Public Budget and Fiscal Policy in Brazil

What is the role of the government in the economy? Besides keeping the macroeconomic variables¹ under control, it must still fulfill what is determined in the Federal Constitution, which includes granting rights to the population through public services, maintaining order and welfare. For Giambiagi and Além (2011), the government has the roles of a regulatory, financial and productive agent, sustaining the economy in bad times. In order to fulfill these roles, this government must manage its assets, liabilities and define its primary result, which are reached through fiscal policy. Moreover, Santos (2007) describes the theory of public choice, according to which the government is not a benevolent agent and is under constant assault from groups of interests who wish to obtain benefits from themselves at the cost of the welfare of others. In line with Gobetti, Gouvêa and Schettini (2010), the government is constantly facing a dilemma regarding the primary surplus: to either increase it in order to reduce the debt or to decrease it (i.e. reduce revenues or increase expenditures) and stimulate the economy. Many macroeconomic models attempt to include these effects of fiscal policy in the economy to represent the role of the government decisions, such as the Keynesian (IS-LM) models, and, more recently, structural vector autoregressions (SVAR) and dynamic stochastic general equilibrium (DSGE) models², as it is important to weigh the governmental decisions on GDP. Therefore, fiscal policy can take two grand sides:

- a) the revenue side, which includes the management of revenues from taxes, contributions, fees from services provided to the society and intergovernmental transfers. In order to enact fiscal policy on this side, Gobetti, Gouvêa and Schettini (2010) suggest that the government may create new taxes or increase the rates of those that already exist, seeking to reduce its deficit. It may also do the opposite and reduce taxes, increasing the available yield and, consequently, the consumption and the GDP;
- b) the expenditure side, which has direct contact with aggregate demand and works around the maintenance of public service. This includes not only paying wages and benefits to civil servants, but making public investments (which are essential to

¹ The government in Brazil has taken a compromise with a macroeconomic trinity since 1999: floating exchange rates, inflation targeting system and targets for the primary surplus. (MACIEL, 2005).

² For more information on these two models, see Auerbach and Gorodnichenko (2012).

provide new public services), social and legal transfers and payments related to the public debt as well.

These data can also be organized in three ways: the budget result, the primary result and the nominal result. There are two mechanisms that influence the works of fiscal policy. The automatic stabilizers are one of them, which represent the changes in revenues and expenditures that do not require governmental action to take place. For example, the volume of sales increases in the end of the year due to the end-year festivities, so it is to expect that the revenue of taxes will rise automatically. Budnevich (2002, p. 1) brought this discussion earlier, stating that “Both types of changes in taxes and spending impact aggregate demand, but the automatic ones may be more predictable and work more quickly than the discretionary ones”. So, there are also discretionary changes in the policy, that is, changes that the government made due to its free will, such as hiring more civil servants, starting new building projects (increasing expenditure through investments), selling public assets and changing tax rates (increasing revenue). Both automatic stabilizers and discretionary movements must be pondered during the managing of the fiscal policy. Santos (2014) writes that the investments are the most discretionary expenditures of the state government, as they work as residuals from the public budget and he even makes an equation for this, called the investment margin, which is obtained through the sum of the net current revenue and the Annulled unpaid commitments (ARP) and the subtraction of the total expenditure (except constitutional transfers and investments). His numbers show that, between 1999 and 2013, the state only had a positive margin in 2008 and 2011, meaning that the state is much more likely to make investments with resources of third parties and the sale of assets.

Some of the responsibilities of the state government are the first instance juridical branch, its Public Prosecution Service, the local polices, the medium complexity health institutions, high school institutions and the Department of Motor Vehicles – Departamento Estadual de Trânsito do Rio Grande do Sul (Detran). Following this line, Frankel (2011b) mentions that the government expenditures are composed mainly of investment projects and the wage bill. These investments revolve around public utility buildings such as schools, hospitals and roads, which award results in the long run, but can take the form of stranded projects³, that is, unfinished, unused or unsustainable constructions. The government wage bill is made of wages and benefits paid to civil servants, and can be considered a fixed cost. These expenditures may vary when the

³ Frankel (2011a) and Ter-Minissian (2011) call these projects as **white elephants**.

public administration makes changes to the plan for jobs and wages, which may be increasing the wages of the civil servants, creating and extinguishing functions, or hiring and firing commissioned servants. Still, according to article 37, XV of the Federal Constitution of Brazil, the civil servants, like all other employees, have irreducible wages, and those who were approved at the competitive examination⁴ obtain the right to stability after three years of effective work (art. 41). These two facts make the payroll costs downward-sticky. For the state, one cannot forget that the political personnel also get these benefits. Moreover, elections are called every four years, and the people must choose the governor, the vice-governor and a number of congressmen determined by the article 27 of the Federal Constitution, which corresponds to the triple of the state representation in the federal House of Representatives⁵, scaling to 12 when the threshold of 36 is reached. (BRASIL, 1988).

As the personnel topic was pointed out, it is important to clarify that the effective civil servants may be active, inactive or pensioners. The three categories must contribute to the social security fund of the state, which is called *Regime Próprio de Previdência Social* (RPPS), according to article 40 of the Federal Constitution. On the other hand, federal servants and political, commissioned and private sectors workers contribute to the *Regime Geral de Previdência Social* (RGPS), which is administered by the federal government, while municipal servants contribute to municipal funds. Giambiagi and Além (2011) already found signs of a crisis in the federal social security system, evidencing the increase of inactive and pensioners, which lead to an increase of values paid and a decrease of values received by the fund, meaning that there is a deficit. The same fact is being observed in Rio Grande do Sul, according to Santos (2014), where the aging of the civil servers and the precocious retirements generate deficits for the social security fund, aligned with the ever-increasing expenditures with inactive and pensioners and a lack of resources that consumes over 30% of the net current revenue and 2.6% of GDP by 2013. The state itself cannot change the retirement rules, as they are defined at the Federal Constitution, making any changes way harder to pass. The social security reform is the utmost suggestion of Santos (2015), starting by a reduction of the retirement ages for men, women and teachers, since an increase of the rates until equilibrium is reached would not be

⁴ In Brazil, citizens who wish to apply for public positions and become effective workers must go through a series of tests. This is established by the article 37, II of the Federal Constitution, which calls these tests *concurso público de provas ou de provas e títulos*. Therefore, three kinds of civil servants may be found: those who were elected by the people, such as mayors and governors, those who were chosen by the politicians to take on commissioned positions and the effective servants approved in the competitive examinations.

⁵ And the number of federal congressmen is a function of the population of each state, whereas the limits are 8 and 70 congressmen per state, according to article 45 of the Federal Constitution.

viable (26,7% for men, 41.6% for women, 40.1% for male teachers and 59.0% for female teachers).

Regarding the budget, every expenditure must have been planned in order to be payable. The first steps towards the budget process were defined by law 4,320/1964, which contains a list of all revenues and expenditures per governmental function, following the economic category. This was later refined by the Federal Constitution, according to which three documents are needed to make the budget of each governmental instance – national, state and municipal. The first one, the mid-term plan - *Plano Plurianual* (PPA), contains the targets of the government for the next 4 years, such as continuous programs (art. 165, §1). The second is the budget directives law - *Lei de Diretrizes Orçamentárias* (LDO), which is made after the mid-term plan and contains the capital expenses for the following financial period, as well as granting changes in the tax legislation and composition of positions and wages in the public administration (art. 165, §2 and art. 169). The LDO is the base for the third and last document of the fiscal administration: the annual budget law - *Lei Orçamentária Anual* (LOA). This law specifies the budget and the funds of the every government office, the investment funds of state controlled companies and the social security budgets (art. 165, §5). Although the revenues and expenditures of the companies are not included in the budget, the accounts of institutions held by the each sphere of government must be included. Each document has its own periodicity of publication and the process is started by the leader of the executive branch, who submits them for approval of the legislative branch. The audit offices have the role of supervising the expenditures that take place after the approval of the laws, seeking to evaluate if they are within the law. If it is not, then it can be said that the expenditure does not have budgetary provision and cannot be paid. If it is paid then the leader of the executive branch may be judged for a crime of responsibility, as defined by law 1,079/1950. (BRASIL, 1950, 1964, 1988).

This documentation discussion was brought to enact one of the difficulties of the fiscal rules regarding the legal aspect, as Ter-Minissian (2011, p. 128) reminded. There is clearly a trade-off between flexibility and commitment when something is turned into a law: “A government can in principle announce its commitment to the achievement of certain values for the targeted fiscal variables for an extended period ahead, without seeking to enshrine it into a law”. By all means, the Federal Constitution has cut any flexibility in the expenditures, as everything must have been planned beforehand and inserted in one of the three laws. It may be a mechanism to assure the efficiency of the public administration, but it can also be disrupting the power of generating aggregate demand by the government, hindering the growth of the economy.

2.3 Structural Balance Models and Applications

The structural balance is a powerful tool for estimating what the result of fiscal policy would have been if the variables that influence the policy were at their equilibrium value. The process involves three parts: the effective result, the cyclical component and the structural component. The final results allow us to compare the fiscal stance and the phase of the cycle, to conclude whether the policy taken was pro-cyclical, counter-cyclical or neutrally cyclical. The basic adjustment is made through the output gap, which requires the use of an output variable and the extraction of its trend, that is, the potential output, and the calculation of the elasticity of the fiscal accounts with respect to the output. However, the output gap is not the only variable that can be used for making the cyclical adjustments: variables that have little correlation to the output gap but that award fiscal revenues large enough to cause impact in the budget balance can be used to complement the analysis. Some examples are the asset prices, terms of trade and commodity prices⁶. (BORNHORST *et al.*, 2011).

According to Oreng (2012), the cyclical adjustment may be conducted with aggregated or disaggregated accounts. This disaggregated method is often called the Organization for Economic Co-operation and Development (OECD) approach, and it consists in estimating the balance of groups/categories of revenues. Girouard and André (2006) suggest the creation of four groups of revenues: personal income tax, social security contributions, corporate income tax and indirect taxes. Each of these groups is subject to the elasticity to their base and their bases will be subject to the output, therefore it is necessary to estimate the “elasticity of the elasticity” to obtain the total elasticity of the tax. However, recreating these groups for the state level may be a difficult task, since states do not have revenues with corporate taxes or personal income tax. It is possible to associate the revenues of *Imposto sobre circulação de mercadorias e serviços* (ICMS), *Imposto sobre a Propriedade de Veículos Automotores* (IPVA) and *Imposto sobre Transmissão Causa Mortis e Doação* (ITCD) as indirect taxes, *Imposto de Renda Retido na Fonte* (IRRF) as the personal income tax of the state’s civil servants and the social security contributions paid by these servants, but taxes that are based on the profits of corporations are responsibility of the federal government, as well as the IRRF of those who are not civil servants

⁶ The well-known Chilean experience reported by Rodriguez, Tokman and Vega (2007) counted with an adjustment to the prices of copper. That worked for that country since this export product is taxed there and its extraction and refinement are hefty enough to increase the fiscal revenues and even move the business cycle. Meanwhile, for the Brazilian scenario, Gobetti, Gouvêa and Schettini (2010) explored the significant amount of royalties from oil extraction activities paid to the government and Oreng (2012) used the Brent oil prices as a proxy for these adjustments, as he didn’t achieve significance while testing for iron ore and soybean prices.

of the state. These last taxes are still important, since there is a fund which distributes the federal government revenues to the states, called *Fundo de Participação dos Estados* (FPE). Basically, according to article 159, I, a of the Federal Constitution, the federal government has to split 49% of its revenues from the income taxes and the tax on industrialized products - *Imposto sobre Produtos Industrializados* (IPI), in a way that 21.5% goes to the FPE and the rest is split between municipalities and regions. It also shares an additional 10% of the IPI revenue with the states, distributed as a function of each state's export, and 29% of the CIDE contribution⁷.

As expected, when something is disaggregated, there are more variables to analyze, and that increases the complexity. For that reason, it is more common to find papers that work with the aggregated approach, commonly called the International Monetary Fund (IMF) approach. Some examples of empirical studies were added to Chart 1, along with the approach used, the geographical location, the time period and the elasticities found for the revenues and expenditures under the IMF approach, where NA means that the adjustment was not applied. The group of revenues used by the authors for the calculation of the elasticity does differ according to the country and the objectives of the study, but it can be interpreted as inelastic if below 1, elastic if above 1 and unit otherwise. It displays the percentage increase of revenues when GDP increases 1%, and the same process is applied for the expenditures.

Chart 1 – Empirical studies

Authors	Approach	Geographic location	Time period	$\epsilon_{R,Y}$	$\epsilon_{E,Y}$
Andreis (2014)	IMF and OECD	Brazil	1997-2013	1.084	NA
Bornhorst <i>et al.</i> (2011)	IMF	Canada	1983-2007	1.4	0.2
Gobetti, Gouvêa and Schettini (2010)	IMF adapted	Brazil	1997-2010	1.803	NA
Maciel (2005)	IMF	Brazil	1999-2005	1.0259	NA
Marcel <i>et al.</i> (2003)	IMF	Chile	1987-2001	1.05	NA

Source: Made by the author.

The first historical example came from Marcel *et al.* (2003), who intended to establish the SBB indicator as the base for the formulation of fiscal policy. They estimated the model for the central government of Chile, through the IMF approach, and estimated ordinary least squares (OLS) regressions with two samples, only to reach a revenue elasticity of 1.05. The potential output was obtained through production function and the Hodrick-Prescott (HP) filter. Although they don't adjust the expenditures to the cycle, they did adjust the effect of copper

⁷ CIDE is not a tax, but a contribution. According to article 177 § 4º, I, b, the executive branch can change its rate without needing to ask for the approval of the legislative branch. The last change happened through decree 5,060/2004 and it turned to zero the rate of several fuel products.

prices in the revenues. The results served well the Chilean government, who adopted a structural target surplus of 1% and displayed better primary results. Rodriguez, Tokman and Vega (2007) then described how the fiscal policy was well conducted with variations of this target and improved the estimation by including the adjustment to the prices of molybdenum.

Still in the international scenario, there are find Bornhorst *et al.* (2011), who wrote technical notes on both IMF and OCDE approaches and contributed with the application of both methods in Canada. Their findings focus mainly in the comparison of both methodologies: the elasticities don't have much effect on the overall result of the aggregate approach, whereas the size of the output gap makes a bigger difference. On the other hand, the disaggregated approach is capable of identifying larger cyclical components and may display elasticities further from the unit.

For the Brazilian case, both Andreis (2014) and Maciel (2005) used the HP filter to obtain the potential output and estimated the output elasticities through OLS regressions without adjustments beyond this gap. The output elasticities of both authors were very close, but their objectives were not exactly the same: Andreis (2014) sought to check if the fiscal policy was pro or counter-cyclical during his sample, finding a 50/50 relation, while Maciel (2005) goes further and makes simulations with fiscal rules based on the structural result. He then affirms that Brazil would benefit from such rules, although they would require more control over the expenditures.

Gobetti, Gouvêa and Schettini (2010) finish this section with a different dosage of econometric models to for the structural budget. These authors used the HP filter to obtain the trend values and proceeded with the estimations of the elasticities to the output and the oil prices through autoregressive distributed lag (ADL) models (1,1) with Markov-Switching and state-space models with the aid of the Kalman filter. These elasticities were then pondered to the GDP and used median values, to find a fiscal contraction from 1998 to 2005 and expansion since 2006.

Based on these results, if the state is aligned with the federal government, then it is expected that the output elasticity of the primary revenues of Rio Grande do Sul is positive and possibly higher than 1 (elastic). Also, there ought to be more pro-cyclical observations rather than counter-cyclical, according to the thoughts of Ter-Minissian (2011).

3 METHODOLOGY

The main method of this study is the structural balance. The basic data analyzed were the primary revenues and expenditures of the state government, extracted from the Real-time public finances tool managed by Secretaria da Fazenda do Estado do Rio Grande do Sul (SEFAZ). (RIO GRANDE DO SUL, 2016). These data were extracted on a monthly basis, inflated by IPCA to prices of 2015M12 and then turned into quarterly, as there is no monthly GDP for the state (although monthly variables would be desirable for running the model, as it increase the number of observations¹). The seasonal adjustment applied to the quarterly series was the multiplicative Census X-13 with no ARIMA specifications. Yet, it is important to remember the idea of Frankel (2011b) that human beings are prone to mistakes, so the possible existence of errors and omissions in the original data or during the procedures of collection and organization cannot be discarded.

As stated by Bornhorst *et al.* (2011), it is important to remove operations which may distort the analysis of the fiscal position. These operations must be large enough to cause impact, otherwise it is not worth the effort of removing them, and must not be recurrent. Thus, the intra-budget operations were removed from the calculation of the primary result, yielding what was named as adjusted primary result.

FEE is responsible for calculating the quarterly and annual GDP's of the state, although this institution still depends on the national accounts calculated by the Brazilian Institute of Geography and Statistics – Instituto Brasileiro de Geografia e Estatística (IBGE). With the output variable collected, it was extended through a state-space model² and then had its trend extracted in order to find the potential output. According to Gobetti, Gouvêa and Schettin (2010), there are three techniques that can be used to find the potential output, which are output regressions, usage of filters (HP and Christiano-Fitzgerald (CF) being the most popular) and the estimation of a Cobb-Douglas production function. However, only the CF filter was used to estimate the potential output. All estimations were run on the Eviews 9 software and the series/variables used were listed on Chart 2.

¹ An alternative estimation was made using the *Índice de Atividade Econômica Regional* (IBCR) as a monthly output variable starting at 2003M1. Braga *et al.* (2014) elucidate it as a good proxy for the level of economic activity, but the results of the state-space model needed for extending this index were too erratic.

² More information on state-space models can be found at Aruoba *et al.* (2016).

Chart 2 – List of variables and their source

Name		Source	Unit	Periodicity
IPCA	Price index	IBGE	Index	Monthly (1999-2015)
PIBTRI	Quarterly GDP of Rio Grande do Sul	FEE	Index	Quarterly (2002-2015)
PIBANO	Annual GDP of Rio Grande do Sul	FEE	Index and R\$	Annual (1970-2015)
FEDERAL	Transfers from the federal government	Real-time public finances tool	R\$	Monthly (1999-2015)
NR	Net primary revenues	Real-time public finances tool	R\$	Monthly (1999-2015)
APEX	Adjusted primary expenditures	Real-time public finances tool	R\$	Monthly (1999-2015)
AREV	Adjusted primary revenues	$RR + FEDERAL$	R\$	Monthly (1999-2015)
RESULT	Adjusted primary result	$APREV - APEX$	R\$	Monthly (1999-2015)

Source: Made by the author.

As the list of primary revenues and expenditures of the state is long, the groups used were dislocated to Appendix A. Next come the details on how the cyclical adjustment is done in the main SBB methodology.

3.1 The Aggregated Approach

Commonly known as the IMF approach, this method is preferred due to its simplicity, as it requires less data. According to Bornhorst *et al.* (2011), the budget balance is the sum of two components:

$$B_t = C_t + S_t , \quad (1)$$

where B is the overall observed balance, C is the cyclical component and S is the structural component at the time t . The cyclical components are directly related to the automatic stabilizers, therefore they are calculated by residuals of the equation. Moreover, the structural balance by itself contains revenues and expenditures that are cyclically adjusted:

$$S_t = R^{CA} - E^{CA} , \quad (2)$$

where R are the revenues, E are the expenditures and CA indicates a cyclical adjustment. This cyclical adjustment can be reached through the multiplication of R or E by the output gap $\frac{y^*}{y}$ to the elasticity to the output (ε_Y). Gobetti, Gouvêa and Schettini (2010) suppose that the output

gap is proportionality related to the quotient of effective and trend levels of revenues and expenditures:

$$\frac{R_{s,t}}{R_t} = \left(\frac{Y_t^*}{Y_t}\right)^{\varepsilon_{R,Y}}, \quad \frac{E_{s,t}}{E_t} = \left(\frac{Y_t^*}{Y_t}\right)^{\varepsilon_{E,Y}}, \quad (3)$$

where Y is the output variable and Y^* is the trend level of the output variable. The elasticities can either be estimated, taken from the literature or assumed. For revenues, one may assume an output elasticity to revenue of 1 and of 0 for expenditures, meaning that all revenues change the same way as the cycle and the expenditures do not suffer a cyclical adjustment to the output gap. The alternative requires pondering the need of adjusting the expenditures. (BORNHORST *et al.*, 2011). However, Gobetti, Gouvêa and Schettini (2010) and Oreng (2012) suggest not adjusting the expenditures to the cycle, under the assumption that they are entirely structural. Traditionally, only the expenditures that are related to unemployment should be cyclically adjusted, but, since Rio Grande do Sul does not have expenditures with unemployment, this adjustment is not necessary. For this study, the elasticities of expenditures were set at 0 and the readjusted primary revenues with respect to the output were estimated with an OLS regression through the formula of Maciel (2005):

$$\log R_t = \forall + \varepsilon_{R,Y} * \log(Y_t) + e_t, \quad (4)$$

where \forall is a constant (the intercept), Y is the state GDP and e is the error term in time t . Also, no adjustments for effects beyond the cycle were done in this study, meaning that only the output gap was used for the cyclical adjustment. The model used was autoregressive with 3 lags. This regression was then subjected to a series of robustness tests and the significance threshold was set at 5%, and dummy variables were added to correct structural breaks and had to correct heteroskedasticity and autocorrelation in the residues.

The next step, according to Maciel (2005), is the calculation of the structural budget balance (SBB) through the following formula:

$$SBB = R_{s,t} - E_{s,t} . \quad (5)$$

Inspired by Andreis (2014), the last part of the study consisted of understanding the cyclicity of the government choices. This was achieved through the calculation of the

difference between the SBB's of each year, the output gap and the correlation between both variables within political cycles and for the entire sample. This allowed for comparisons the cyclicity of fiscal policies of Brazil and Rio Grande do Sul.

3.2 Limitations of the Method

The major problem of the IMF approach is that it does not distinguish the changes caused by the automatic stabilizers from those caused by discretionary movements, as all values are aggregated. Moreover, it suffers from the balanced budget multiplier problem, which implies that increases in tax revenue and expenditures do not lead to an increase in aggregate demand, what is not true empirically. (BUDNEVICH, 2002). In order so solve these issues, it would be necessary to open the revenue and expenditure accounts, thus increasing complexity of the models and requiring more compatibility with the data.

Filtering tools come with their own set of problems as well. Although being the easiest tools to use for obtaining trend values. They require less data, but are criticized for being too mechanical and fragile when the models present structural breaks. (MACIEL, 2005). Ter-Minissian (2011, p. 121) criticizes these methods, stating that:

[...] all existing methods of estimation of potential output (HP and other filters; or production functions) suffer from technical problems, especially significant in the presence of structural breaks, limited observations, and/or frequent significant revision in the GDP estimates.

Still, there is no perfect way of estimating the trend variables: every method may have its flaws, but, in the end, they all look into an approximation to reality, that's why they are called estimations.

4 PRESENTATION AND ANALYSIS OF THE DATA

The purpose of this section is to describe the data used in the study. Their source is *Contadoria e Auditoria Geral do Estado* (CAGE), which is the department of SEFAZ responsible for making the public accounting of Rio Grande do Sul through the FPE and AFE systems, which mean *Finanças Públicas Estaduais* and *Administração Financeira do Estado*, respectively. SEFAZ makes the data available to public through the Real-time public finances tool (RIO GRANDE DO SUL, 2016) and also publishes reports with the official data of every two months through the official press called *Diário Oficial do Estado do Rio Grande do Sul*. However, the data from these reports are bimonthly, and since data in this periodicity are not usual in econometric models, they were not much of use. Turning the data into semesters was not a viable solution, as it would reduce the number of observations. In order to solve this issue, the data were collected on a monthly basis from the Real-time public finances tool and the primary result was calculated manually. Yet, the data for the periods of 1999-2006 are different between these databases due to constant changes in the accounting methodologies¹. Still, this source² has a great level of detail and can be updated anytime, as it is online.

Both revenues and expenditures have two major economic classifications: the current operations, which result from the daily activities of the state necessary to execute services, and the capital operations, which change the assets of the state government, such as credit transactions and real estate purchases. A greater description of these accounts can be found in Appendix B, while Appendix C is dedicated to describe the collection procedures.

Many means of verification were used, such as double equals formulas and conditional formatting for duplicate entries, to make sure that the sum of every revenue would lead to the total shown in the data and that the data for two months would be the same as the one that appears in the RREO's (whenever possible). Normal errors at the data include the minus sign at the end of the number (which Excel does not understand), the absence of the total account, in which case a sum formula was used considering the current revenues and the capital revenues

¹ Brasil (2014b) describes the methodology currently used to classify the public accounts. Yet, new accounts are added and some are excluded from the public accounting every year, as the National Treasury and the state's CAGE publish new ordinances. Examples can be found at accordance CAGE number 04/2007, 04/2002 and the state decree 42,085/2002. Moreover, the data for 2008-2015 is available in that maximum level of detail, that is, with 12 digits of specification code. Data prior to this period is still under adaptation by SEFAZ.

² Examples of alternative sources are the time series of BCB, the Transparency Portal of the State, the Transparency Map, the database of the Institute of Applied Economic Research - Instituto de Pesquisa Econômica Aplicada (IPEA) (annual data) and the Summarized Budget Execution Reports - *Relatório Resumido da Execução Orçamentária* (RREO) of SEFAZ (bimonthly data).

of that institution³, and weird signs at the deductions⁴ account, from 1999 to 2003. In order to unravel this topic, a standard was adopted: in these periods, the deductions could have a positive sign, so the total was taken as correct and the sign of the deductions was changed in order to reach the total. Notoriously, the total would be different when searching for the total revenues using the total (which normally yield the double of the correct amount), the source (which ignores the deductions) and the classification options (the most complete one). Another strange fact is that institutions with no revenues were found along the sample, which are Caixa Estadual and IPERGS during 1999, FPA in 2004 and FIGTF in 2006, indicating that some data may be missing from the database. Lastly, negative revenues were found frequently. These come from operations such as payment of interests, transfers from agreements (exceptional expenditures, constructions), cancellation of revenues, withdrawals from development funds, inheritance in abeyance, and net earnings from the judicial deposits, and were treated as normal revenues.

It is important to remove the intra-budget operations as they don't increase the total wealth of the state and, as Santos (2015) explains, the intra revenues and expenditures should be equal but rarely are, since the posting criteria is unstable. Only the verified expenditures were considered, and not the paid ones, since Brasil (2014a) uses only the verified revenues at the fiscal demonstrations. Moreover, this tool does not display the non-processed unpaid commitments, which add to the verified expenditures of December in the RREO's, but these values eventually show up in the subsequent period as **Expenditures from the former accounting period**.

After these modifications, the adjusted⁵ primary result was calculated. However, it was observed that the state kept changing its methodology through time, by adding and removing accounts from the procedure. If the methodology of each month were to be figured out, then it would be impractical to compare the result between periods. A solution was to adopt another standard for the primary result methodology, which is shown in Chart 3. The differentiation of primary and financial accounts was based on the budgetary classification tables available at Brasil (2016).

³ Each month has between 25 and 31 institutions or 28.6 on average. A list of every institution and the periods they were present at the sample is shown in Appendix B.

⁴ Deductions should always have a negative sign. Yet, when the accrued data from 1999 to 2002 is turned into pure monthly, positive signs appear sometimes. Also, these monthly nominal values are nearly 100 times smaller than the rest of the sample (all inferior to 100 million). The signs alone can't explain this difference, even knowing that some institutions other than the direct administration have deductions for the first period, and only the direct administration has deductions on the other periods.

⁵ This adjustment refers to the extraction of the intra-budget revenues and expenditures from the database.

Chart 3 – Primary result calculation method

Primary revenue = Total revenue - (Interests from bonds + Remuneration from bank deposits + Remuneration from investments of the RPPS + Other revenues from real-estate values) - Annulled unpaid commitments - (Credit operations + Divestment of goods + Loan amortization).
Primary expenditure = Payroll and benefits + Other current expenditures + Investments + (Other financial investments – loans granted).
Adjusted primary result = Primary revenue – Primary expenditure – Intra-budget operations.
Net primary result = Adjusted primary result – Federal government revenue sharing – miscellaneous transfers from the federal government (both current and capital).

Source: Made by the author.

The first parentheses in the revenues part represent the financial applications deducted from the estate revenues account. As explained in Brasil (2014a), these values are eventual, but must exclude the dividends and holdings. It is not specified which accounts must be financial, so there is a large interpretation for the casualty, which explains why the state keeps changing what represents the financial applications as time passes (besides the fact of creation and exclusion of accounts over time). These four accounts were chosen because they are the most frequently found for the periods that the data are better organized, that is, 2008-2015, leading to an error 0.00% between the data from the Real-time public finances tool and the RREO, but a mean error of 127.45% for the other period, as can be seen in Table 1. It is important to remember that, the more financial accounts (keeping the total revenues constant), the smaller the primary result will be. Therefore, unjustified changes in the methodology could lead to the manipulation of the result, even considering the errors and omissions. While Santos (2015) focuses on the heterogeneity and the duplicates found in the expenditure, the revenues share these problems as well.

Table 1 – Comparison of the financial investments between tools (nominal values in thousands of R\$)

	Interests	Deposits	RPPS	Other	Sum	RREO	Dif (%)
1999	142.1	0.0	0.0	16,256.9	16,398.9	NA	NA
2000	108.1	0.0	0.0	69,197.9	69,306.1	101,509.5	-31.72
2001	0.0	0.0	0.0	70,383.5	70,383.5	79,264.6	-11.20
2002	0.0	0.0	0.0	74,201.5	74,201.5	98,591.0	-24.74
2003	58.7	55,838.6	0.0	189,790.0	245,687.3	65,351.0	275.95
2004	167.5	36,929.5	0.0	75,677.8	112,774.8	36,929.0	205.38
2005	234.7	55,291.4	0.0	116,813.2	172,339.3	55,291.0	211.69
2006	213.6	27,549.8	0.0	277,862.4	305,625.8	27,763.0	1,000.84
2007	189.4	80,192.3	0.0	109,103.5	189,485.1	80,381.0	135.73
2008	219.9	63,880.4	146,519.8	3,336.9	213,957.1	213,957.1	0.00
2009	197.2	138,422.8	113,261.5	14,931.4	266,812.8	266,812.8	0.00
2010	20,495.2	158,364.3	15,952.3	4,677.6	199,489.3	199,489.3	0.00
2011	173.5	101,672.1	11,718.6	4,118.9	117,683.1	117,683.1	0.00
2012	1.2	101,773.0	598.8	3,256.4	105,629.5	105,629.5	0.00
2013	0.0	110,555.8	3,216.8	3,284.1	117,056.7	117,056.7	0.00
2014	0.0	146,527.6	24,590.1	3,994.9	175,112.6	175,112.6	0.00
2015	15.9	134,117.2	44,418.5	3,202.4	181,753.9	181,753.9	0.00

Source: Made by the author with data provided by SEFAZ.

Next, the Annulled unpaid commitments (ARP) considered for the calculation were always the total, even knowing that SEFAZ has stopped considering some of them as financial after the third bimester of 2014. It was not possible to distinguish the primary ARP from the financial ones using the Real-time public finances tool because the data would always come accrued, there are many possibilities of subaccounts inside the ARP and these subaccounts tend to change over time. For example, from 2008 to 2015 there are 4 kinds of ARP, being the non-bound, the health-bound, the education-bound, and the other bound, but each one has many subaccounts, leading to nearly 220 operations to analyze each month. This problem gets even bigger prior to 2008, because there were 13 kinds of ARP⁶. Santos (2015) presented the same complaints about the ARP when he was calculating the net current revenue, but he wrote that these are less significant details and don't invalidate the global analysis.

The primary revenues and expenditures are enough to run the regressions of the IMF approach; however, separating the state revenues from the transfers from the federal government is a must for this purpose. The accounts that were separated were the share in the federal revenues and the miscellaneous current and capital transfers (examples are social programs created by the federal government, which yield transfers to the state government and diverse allowances). Importantly, the correlation to the annual GDP in R\$ was of -0.4866 for the current transfers and -0.2946 for the capital ones, meaning that both variables have little relation to the GDP and could even reduce it. These operations may also be reckoned as one-offs, under the definition of Bornhorst *et al.* (2011).

The sums and participations of each revenue are displayed in Table 2, through which ICMS shows as the highest revenue, followed by the current transfers and then by the contributions. Take note that, for simplification, all deductions were kept aggregated, as the deductions prior to 2007 were not distinguished by groups in the database, making it unmanageable to know how much was related to transfers, ICMS and other revenues. These data were then corrected by the inflation using the IPCA index, which is the same one used by FEE (2014) when calculating the GDP.

⁶ An attempt was made to manually find out these values. A Solver package for Excel was used, but it tended to give multiple results for the same set of accounts. Yet, some ARP showed as primary in one month then as financial in the text, leading to misclassifications. The solution was to consider every single ARP as financial, since these revenues should not even be considered budgetary, according to Brasil (2014a).

Table 2 – Summed primary revenues (R\$ of 2015M12 by IPCA)

Revenue	Summed value	Value/total (%)
ICMS	364,985,776,736.46	64.21
IPVA	28,703,623,687.22	5.05
ITBI	51,441,500.16	0.01
ITCD	3,608,872,287.33	0.63
IRRF	18,921,575,714.61	3.33
Fees	16,601,210,622.40	2.92
Contributions	33,560,118,231.21	5.90
Net real estate	6,691,788,845.78	1.18
Agricultural	34,612,488.37	0.01
Industrial	57,893,653.98	0.01
Services	5,503,333,568.76	0.97
Current transfers	120,361,805,343.55	21.17
Share Federal	42,479,193,852.29	35.29
Misc. Transfers	1,314,876,623.77	1.09
Other current - ARP	18,058,109,282.58	3.18
Capital transfers	3,633,186,665.80	0.64
Misc. Transfers	60,649,878.81	1.67
Other capital	20,116,504.75	0.00
Deductions	-52,370,761,784.24	-9.21
Total	568,422,703,348.72	100.00

Source: Made by the author with data from Rio Grande do Sul (2016)

The calculation of the quarterly primary result series led to 68 observations, where 54 represent a primary surplus and 14 a deficit. If the revenues and expenditures of each year were split equally between each quarter by the calculation of means, then the values shown in Table 3 would be reached. Subsequently, the mean revenues of the state rose from 1999 to 2002, had an abrupt reduction in 2003 and started growing again until 2010, after which they started having a more erratic behavior until starting to decrease in 2014 and 2015. The expenditures had a similar behavior, showing growth between 1999 and 2002, only to reduce in 2003 and 2004 and start growing again in 2005. Thus, for the years of 2003, 2014 and 2015, the state tended to have a primary deficit. It is worrisome that the two last deficits are consecutive, meaning that the endless crisis in the public finances referenced by Santos (2014) is real, considering the rule of two consecutive decreases of Morais (2013). Yet, a certain vain attempt in reducing this crisis can be observed, as the expenditures from 2015 have been reduced by 2.39% but the revenues have been reduced in a superior amount, that is, 3.97%. This crisis gets even worse when aligned with the data from BCB (2016a) regarding the constantly rising net debt of Rio Grande do Sul State government. Logically, if the government has a primary deficit, it means it has no savings to pay the public debt, only making its situation worse.

Table 3 – Mean annual values of the adjusted primary accounts (R\$ of 2015M12 by IPCA)

	Mean revenues	Mean expenditures	Mean Result
1999	5,565,434,509.24	5,254,334,440.42	311,100,068.82
2000	6,499,889,181.81	6,152,359,583.68	347,529,598.13
2001	7,028,584,181.84	6,371,304,947.01	657,279,234.83
2002	7,413,987,425.03	6,728,167,431.87	685,819,993.16
2003	6,553,349,313.52	6,600,109,372.32	-46,760,058.80
2004	6,806,454,273.80	6,703,949,121.95	102,505,151.85
2005	7,448,901,497.03	7,168,994,311.86	279,907,185.17
2006	7,649,056,830.58	7,490,023,016.83	159,033,813.75
2007	7,776,767,357.43	7,303,579,499.27	473,187,858.17
2008	8,768,496,624.87	7,728,518,373.03	1,039,978,251.84
2009	8,771,310,762.52	8,028,214,807.38	743,095,955.14
2010	9,874,744,382.98	9,122,761,149.22	751,983,233.76
2011	9,812,772,957.15	9,160,583,834.53	652,189,122.62
2012	10,066,768,828.52	9,620,162,571.60	446,606,256.92
2013	10,647,803,792.28	10,313,394,029.99	334,409,762.29
2014	10,927,783,191.55	10,985,376,101.15	-57,592,909.60
2015	10,493,570,727.04	10,722,346,745.48	-228,776,018.44

Source: Made by the author with data from Rio Grande do Sul (2016).

Interestingly, the expenditures with Personnel and benefits are superior to 50% of the expenditures in all quarters, except during 2009-2011, when the expenditures with retirement and pensions was included in the Other current expenditures accounts. Santos (2015) also made this finding and he explained that the state kept changing the values that were directed to the personnel and other revenues accounts until the standard established by the interministerial ordinance 163/2001 was adopted successfully. Moreover, the Audit Office of the state has allowed the exclusion of several accounts from the Personnel and benefits groups, such as pensions, medical assistance, funerary, food and transport assistances, and scholarships, what allows the state to bypass the limit of 60% of the net current revenue established by the article 19 of the fiscal responsibility law. (BRASIL, 2000). These forms of creative accounting allow the state to increase its expenditures and, consequently, have a higher deficit, but it is hard to blame the government for taking such actions, as the personnel expenditures are very hard to reduce, since they are bound to rights acquired and to be acquired by the civil servants.

The Other current expenditures group also deserves attention, as it contains the constitutional sharing of revenues⁷. This group is usually the second highest in expenditures, representing 44.32% of the total, and this value is composed mainly by transfers to municipalities

⁷ In the Real-time public finances tool, these expenditures were displayed as **Sharing of revenues** from 2003 to 2015, and **Transfers to municipalities** before this period.

(46.88%), other third-party services (16.59%), retirements (7.78%), consumables (3.34%) and pensions (2.56%). Although the highest expenditures cannot be deducted due to constitutional forces, the government has control over the other expenditures. Besides, this group represents a certain danger, as it is not limited by the fiscal responsibility law. Fortunately, the bidding law forces the principles of legality, publicity and efficiency to the purchases of the public administration, and every expenditure directed to this group must have been foreseen in the LOA, hampering the creative accounting practices. (BRASIL, 1993).

After this momentary descriptive analysis, the data were adjusted for seasonality by the Census X-13 method, so it yields the same result as the X-12 method.

4.1 Obtaining the GDP

FEE's quarterly GDP was available for the period of 2002-2015, therefore it was necessary to use a model to extend it to 1999. As the annual GDP of the state was available up to 1970, these data were used as a base in the state-space model estimated in Eviews 9 with Eviews Legacy as the optimization and Marquardt as legacy methods⁸. Logically, the model merely extended the GDP from 2002 to 1999, based on its behavior in the future. Any crises that might have occurred within these years cannot be captured by this model.

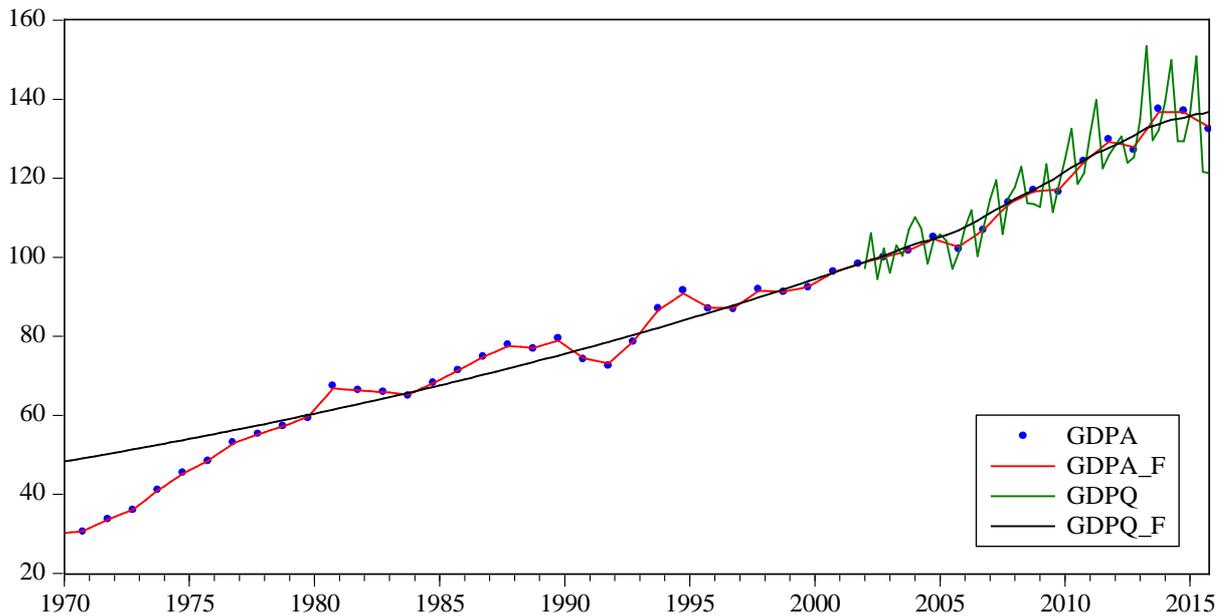
The comparison with other models can be found in Appendix A. The criterion for choosing the model was the one that had the lowest value for Akaike criterion, as suggested by Gujarati and Porter (2011), and the constants were removed from most estimations as they were statistically equal to zero (p -value > 0.90 in models 1, 3 and 4) and tended to yield very high values for the final states (thousands), increasing the error. Figure 1 displays the comparison between the two original and the estimated series, which were obtained by using the smoothed forecast tool at model 1. GDPQ stands for the quarterly GDP and GDPA is the annual GDP, both official data with base mean 2002=100. GDPQ_F is the smoothed estimation, as it shows an upward curve similar to a trend. However, the model is still accurate because the values forecasted for GDPA_F get very close to the original data of GDPA. The correlations stand between 0.9395 and 0.9993 for the original and the estimated data, but incur in a mean difference⁹ of 0.338% for GDPQ_F and 0.021% for GDPA_F, being 12.79%

⁸ The software was very unstable when estimating these values, as sometimes it would yield extremely high values for the information criterion (thousands) and, when the space was re-estimated with the same specification, these values would drop to around 500 or 50.

⁹ Mean of each value of GDPQ_F divided by GDPQ minus 1, or GDPA_F divided by GDPA minus 1. This represents how much the estimation goes beyond the original values.

and 0.84% the maxima and -13.55% and -0.99% the minima, respectively. In order to avoid these errors, a new series called GDP was created using the PIBTRI observations for 2002-2015 and GDPA_F for 1999-2001, as the latter seems to represent better a seasonal behavior. The series was then adjusted for seasonality¹⁰ by multiplicative Census X-13 and had its base changed to 1999Q1 to make interpretation easier. The seasonal factor of this series turns out to be very close to the unit, with mean of 0.9994, minimum of 0.9398 and maximum of 1.0979, meaning that the index series is not very affected by seasonality.

Figure 1 – Extended quarterly GDP (index number, mean 2002=100)



Source: Made by the author through Eviews 9.

The next step required changing the base of the quarterly GDP to 1999=100, taking its natural logarithm and running the augmented Dickey-Fuller (ADF) test¹¹, which indicated that this series has unit root with a result of $t=-3.452067[0.0532]$, therefore this variable is not stationary and follows a random walk pattern at 5% significance. On the other hand, after converting the readjusted revenues series into index number with base 1999Q1=100, and taking its log, it displayed unit root as well, but only when tested with intercept ($t=-2.115376[0.2394]$) and with neither intercept nor trend ($t= 1.681651[0.9766]$). As unit root problems frequently

¹⁰ FEE (2014) used provide spreadsheets with both seasonally adjusted and unadjusted data. It is possible to know that the current data do not have this adjustment because, when compared to the same series that was posted on FEE's quarterly GDP webpage on August of 2015, its first observations are equal to those of the unadjusted series.

¹¹ With trend and intercept, data in level and automatic lags. t stands for the t -statistics of the test and the value in brackets is the p -value. Removing the intercept or both variables leads to even higher p -values. Tests with breakpoints lead to similar conclusions.

appeared in these series, Gujarati and Porter (2011) suggest testing for cointegration between them, otherwise there is a risk of incurring in a spurious regression. The test ran and its results are shown in Table 4 and the null hypothesis of no cointegration between these series can be rejected at 5% significance, meaning that the series are cointegrated for both tau and z statistics. Therefore, the tests may be made with the variables in level, as they will reach equilibrium in the long run¹². (GUJARATI; PORTER, 2011).

Table 4 – Engle-Granger cointegration test results

Automatic lags specification based on Schwarz criterion (maxlag=10)				
Dependent	tau-statistic	Prob.	z-statistic	Prob.
LOGINR	-4.986740	0.0006	-32.91065	0.0011
LOGGDP	-4.716572	0.0015	-31.47710	0.0017

Source: Calculated by the author through Eviews 9.

4.2 Estimating the Output Elasticity

The output elasticity may be estimated through least squares (LS) regressions. Several econometric approaches were taken during the estimation process, with different estimation methods and addition and removal of dummy variables and trends, as allowed by Bornhorst *et al.* (2011). The models estimated were listed in Appendix A, and model 3 was chosen, as its time series problems were solved and the elasticity found was compatible with the literature. However, before starting the estimations, it is important to bear in mind that the GDP cannot explain every primary revenue of the state. Many goods sold are not taxed and there is a problem with exports, which increase GDP but do not impact state revenues, and imports, which reduce GDP and increase revenues.

The starting point was the basic model, which contained an OLS regression with no lags or dummy variables. This model orients the adjustments that will be necessary, as it shows heteroskedasticity for all tests except ARCH and strong autocorrelation with 1 and 2 lags. Although the residuals had normal distribution, adding lags to $\text{Log}(GDP)$ would cause a severe penalty to this property. Also, when solving one of these problems, another would usually show up, so some models required change of the covariance method.

In order to eliminate the autocorrelation, several autoregressive models were tested, being Model 1 with 1 lag, Model 2 with 2 lags and Model 3 with 3 lags added to $\text{log}(INR)$,

¹² Other ways of solving the unit problem include estimating models with the variables under first difference and VAR/VEC and error correction models, which require a more advanced econometric approach. Models estimated with the variables differentiated did not have significant coefficients.

then the Bai-Perron tests were run in order to find the dates indicated for dummy variables. Model 1 had the highest R^2 and the least errors, but its elasticity was not so compatible with the literature (it was too low) and it had heteroskedasticity problems. Model 2 failed to solve the autocorrelation problem, what cannot be accepted according to the concepts of autoregressive models of Gujarati and Porter (2011). For model 3, most breaks had been solved prior to the addition of the dummy variable, but the Bai-Perron tests of $L+1$ vs. L globally determined breaks found an estimated break point by 2002Q1, 2004Q2, and 2008Q1, so a dummy variable was created with values of 1 around this date until the model became stable, which is a true exercise of trial and error, considering that, after every new entry, the Bai-Perron tests of $L+1$ vs. L sequentially determined breaks would have to be run to check if the dummy¹³ caused new breaks. Alternatively, models with AR terms were estimated, but they tended to yield volatile elasticities due to the higher errors. Also, adding multiple lagged variables to the models tended to make at least one of them not significant. Therefore, the following autoregressive model was estimated¹⁴:

$$LOG(INR_t) = \frac{-1.4001}{(0.3185)} + \frac{1.0908 * LOG(GDP_t)}{(0.1432)} + \frac{0.2509 * LOG(INR_{t-3})}{(0.0839)} - \frac{0.0778 * DUM03}{(0.0160)} ,$$

where INR is the index of the net primary revenues, GDP is the index number of the quarterly GDP and $DUM03$ is a dummy variable which contains values of 1 for the periods of 2002Q1, 2003Q2-2004Q2, 2007Q1-2008Q2, and 0 for the others. This model is quite similar to one of the estimations of Gobetti, Gouvêa and Schettini (2010), according to whom the presence of the lagged dependent variable on the right side of the equation allowed for partial improvements of the model. The output elasticity corresponds to 1.0908, meaning that, each time GDP increases 1%, the primary revenue of the government should raise by 1.09%. This value, however, is a mean, so it can vary between 0.8045 and 1.3771 in a confidence interval of 95%, and is statistically equals to 1 according to Wald Test with $t(61)=0.634256[0.5283]$, which hints little influence of the elasticity on the cyclical adjustment. It is also statistically equal to the national elasticities found by Andreis (2014) and Maciel (2005), which were 1.084 ($t(61)=0.0476[0.9622]$) and 1.0259 ($t(61)=0.45338[0.6519]$).

¹³ The dummies may vary between models due to different lag specifications; therefore a table of dummies was added to Appendix A.

¹⁴ The parentheses under each coefficient mean the standard error of the coefficient.

No lags were added to GDP by the understanding that a transaction made in month t will lead to an increase of the GDP of that quarter only, as the aggregate value is created immediately, even considering the lag of the official data release (6 months for the quarterly GDP). On the other hand, the 3 lags of INR might seem high, but can be explained by the tax payers' default and their subscription in the active debt, a process which can take near 180 days. As written in chapter XIV of the Normative Ruling number 045/98 of the state Revenue Office, the state may inscribe a credit¹⁵ in the active debt until 61 days after the due date (in case of tax credits) or 90 days (non-tax credits). However, these deadlines only start counting if the tax payer does not open a complaint about the debt. In this case, it may take up to 186 days until the credit is finally recognized as active debt, as the administrative ways grant right to defense to the tax payer through many stages of analyses, according to the articles 17 and 33-66 of the law 9,298/1991. Yet, this deadline may become even bigger considering the extra 180 days that the government has to wait until charging the debt by juridical means, according to law 9,298/1991. Thus, it makes sense to have lagged revenues, considering that the active debt represents 1.06% of the adjusted primary revenues and that the same effect should happen with the credits of the federal government. (RIO GRANDE DO SUL, 1991, 1998).

As a last test, Gujarati and Porter (2011) suggest checking if the series have really cointegrated, as they had unit root before and could still incur in a spurious regression. Therefore, the residual series was extracted from model 3 and the ADF test was run again. This time, considering 3 lags, with $t = -4.669337[0.0020]$, the null hypothesis of unit root is rejected at 5% significance, meaning that the series became stationary in the long run.

4.3 The IMF Approach

In order to run the structural balance models, it was necessary to estimate the potential GDP. It can be obtained by finding the trend of the GDP and dividing¹⁶ it by the original GDP $\left(\frac{Y^*}{Y}\right)$. Under this definition, the result can neither a negative number nor zero, and the trend is set at 1. If the gap is bigger than 1, it means that Y^* is bigger than Y , so the GDP stayed below the trend level, and vice-versa. This interpretation, although different from the traditional

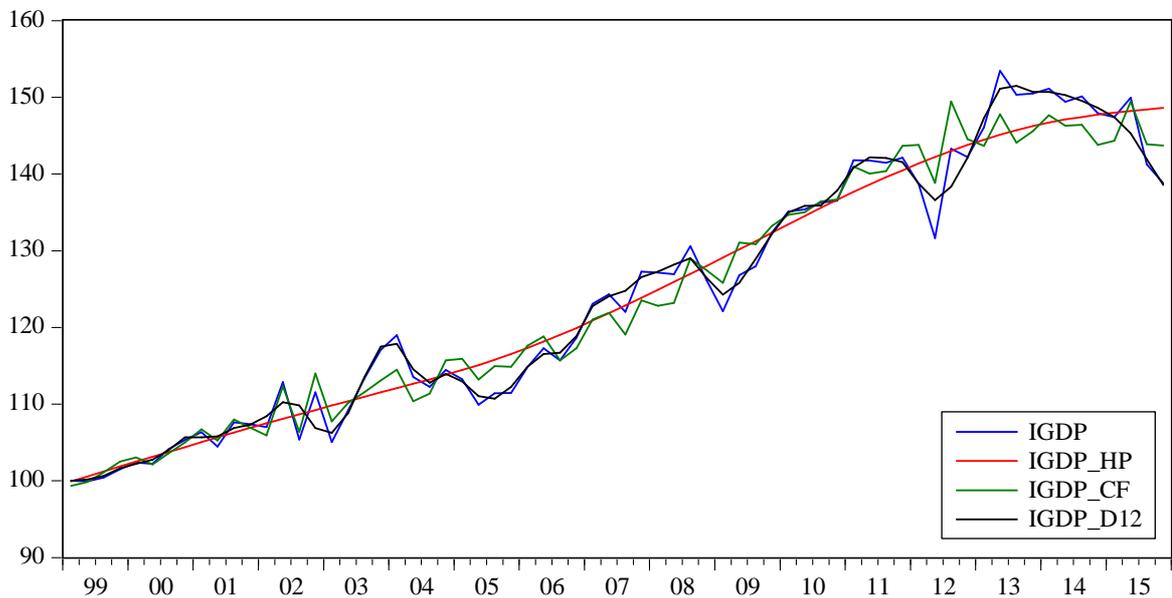
¹⁵ A credit to the state corresponds to a debt of the tax payer. For more information on the accounting procedures of default and active debt, please refer to Brasil (2014b, p. 263).

¹⁶ When running these filters on Eviews 9, the software also provides the cycle of the series. This cycle, however, is calculated by $(y - y^*)$, which yields negative numbers (making it hard to work with powers, as there is no real even-numbered root of a negative number) and is in the opposite order indicated for the SBB methodology. The alternative, for Bornhorst *et al.* (2011), is to treat the gap as a ratio: $\left(\frac{Y^*}{Y}\right) * Y = Y^*$.

analysis of gap of product, makes economic sense for the SBB methodology: when the economy is a above trend level ($Y > Y^*$), the adjustment that needs to be applied is to reduce the primary revenues, bringing it to its equilibrium value, so the gap must be smaller than 1. Equation 3 still keeps its validity as well¹⁷.

Three filtering techniques were used: the HP filter, with $\lambda = 1,600$, the CF full sample asymmetric filter for random walk series, removing the linear trend, and the X-13 trend with the base changed to 1999Q1, in the same manner as Andreis (2014) had done. Figure 2 displays the comparison of the three trends and the original series.

Figure 2 – Trends extracted from the Index GDP series (1999Q1=100)



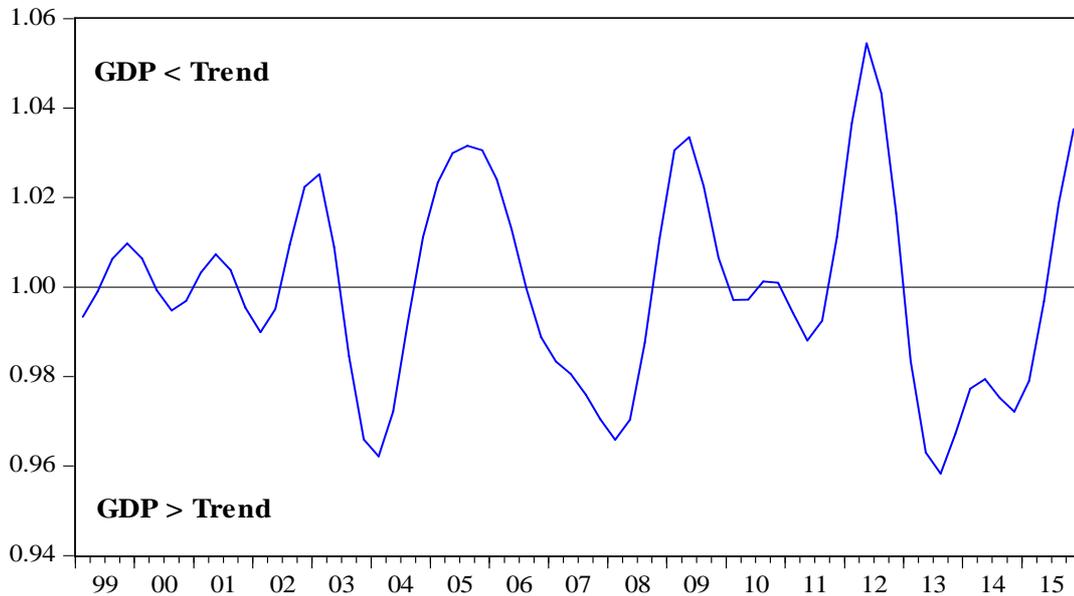
Source: Made by the author through Eviews 9.

Each trend is almost perfectly correlated ($\rho > 0.97$) with each other and with the original series (IGDP), but the HP trend displays the smallest correlation ($\rho = 0.9771$) and IGDP_D12 the highest ($\rho = 0.9954$). It can be noticed that only the HP trend displays an almost linear movement, as it was smoothed by the λ parameter, while IGDP_D12 walks side-by-side with the original series, as it was obtained from the seasonal adjustment, and IGDP_CF follows it, although making more spikes. The descriptive statistics of each trend series can be found in Appendix A and there is not much difference between each series, as theirs means are statistically equal (F test=0.001676[0.9999]) and that all of them follow a normal distribution considering 5% significance. Therefore, for this study, the CF output gap was chosen as it represented better the wave-like movements of a cycle and lesser volatility. This representation is

¹⁷ For more information on how to obtain the output gap and the cycles, please refer to Giorno *et al.* (1995).

shown at Figure 3. For a comparison, the HP filter gap, which is commonly used by the literature, showed more spikes and was the gap which got furthest from the trend.

Figure 3 – Output gap by the CF filter



Source: Made by the author through Eviews 9.

The calculation of the structural budget balance then proceeded with an extension of equation 5:

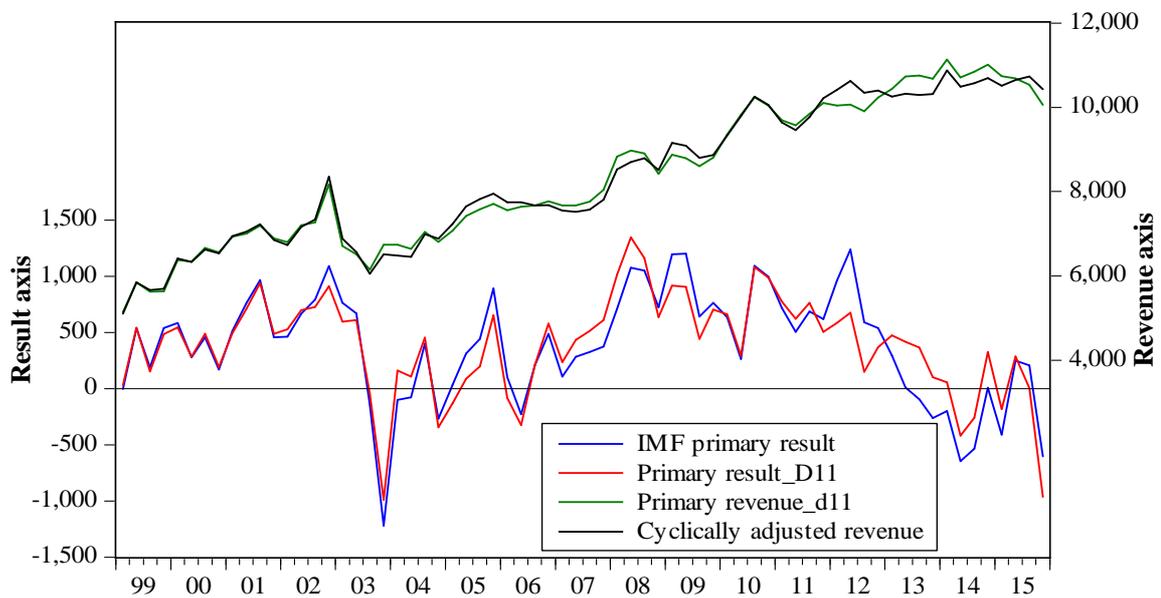
$$S_t = NR_t \left(\frac{Y^*}{Y}\right)^{1.0908} + Federal_t - Ex_t \left(\frac{Y^*}{Y}\right)^0, \quad (6)$$

where NR is the net primary revenue, $Federal$ are the revenues transferred from the federal government, and Ex is the primary expenditure at time t . The federal government transfers did not receive a cyclical adjustment, as they are not entirely related to the GDP of Rio Grande do Sul and the elasticity of the expenditures was set as 0, meaning that they don't react to the cycle, as suggested by Bornhorst *et al.* (2011). Considering that the elasticity of the revenues was a number smaller than 1, three effects can happen: if the GDP and the trend are the same, then the cycle will be equals 1, and the cyclical adjustment will have no effect. However, if the GDP is above the trend, then the government has earned higher revenues due to the cycle, so the adjustment is applied with a gap smaller than 1 in order to remove this "extra" earning. The opposite interpretation leads us to the actual cost of the cycle, as the adjustment is made with numbers higher than 1, inputting the revenues the government lost due to the cycle. Outwardly, 37 of the 68 gaps (54.41%) turned out to be smaller than 1, denoting that the state economy is more likely to be operating above the trend level with extra revenues. This result does differ

from the proportions that Andreis (2014) calculated for the Brazilian gap between 1997 and 2013, for whom the Federal government was more likely to be below the trend level of the national GDP (58.82% of 17 observations) but agree with Maciel (2005), with 4 out of 7 observations (57,14%) containing the GDP higher than the trend.

The results for revenues and the primary result do not change whether index numbers or real values are used, and can be seen at Figure 4. Whenever the gap is bigger than 1, the adjustment forces the revenue and the primary result up, and vice-versa. This adjustment, however, is rarely strong enough to change a surplus into a deficit (and vice-versa), which only occurs in 1999Q1, 2004Q1, 2004Q2, 2005Q1, 2006Q1, and 2013Q3-2014Q1. Of these 8 periods, 6 presented surpluses according to the original data, however, they were all above the trend GDP, which, after the extraction of the cyclic factor, turned into a deficit, and the opposite happened in the other two periods. Moreover, of all the deficits found in the original data, half were found when the potential GDP was higher than the effective GDP, and so otherwise, meaning that it is inconclusive whether the gap influences or not the fact of having a deficit.

Figure 4 – Adjusted revenue and result by the IMF approach (R\$ millions of 2015M12)



Source: Made by the author through Eviews 9.

The most interesting results show up when they are compared to the GDP because they help providing a magnitude in relation to the state economy. As FEE does not publish the quarterly GDP in nominal value, the results had to be summed to an annual basis and then compared to the annual GDP updated by the IPCA index. This GDP is displayed at Table 5 along with a few other data: the observed primary result (Obs) in proportion to the state GDP,

the result of the structural budget balance (SBB) and the difference between these two, which represents how much the cycle has added or subtracted from the primary result related to the GDP. If it is negative, that means the effective output was below the trend level, so the state lacked fiscal effort to reach this trend, and, if positive, the state was above the trend level, and received these extra revenues due to the cycle. These contributions vary between -0.43% (2012) and 0.36% (2013), which are the periods with the highest (1.038) and smallest mean output gap¹⁸ (0.968), meaning that, the higher the amplitude of the cycle, the higher the difference between the observed result and the SBB will be. Also, the mean contribution of the cycle of 0.01% may seem small, but it gets significant when multiplied by the GDP of billions. Therefore, the fact that the state usually operates above the trend level is once again confirmable, as the mean structural balance is lower than the mean observed primary result.

Table 5 – Structural budget results (% of annual GDP)

	GDP (R\$ of 2015)	Observed	Structural	Obs-SBB	SBB_t-SBB_{t-1}
1999	195,424,575,077.24	0.62	0.65	-0.02	NA
2000	203,846,531,867.84	0.74	0.73	0.01	0.08
2001	228,806,602,167.39	1.15	1.18	-0.03	0.45
2002	232,353,542,993.82	1.23	1.30	-0.06	0.12
2003	251,003,109,637.48	0.07	0.03	0.04	-1.27
2004	258,145,516,567.08	0.15	-0.02	0.16	-0.05
2005	255,567,042,509.28	0.32	0.66	-0.34	0.68
2006	269,450,070,960.10	0.14	0.21	-0.07	-0.44
2007	290,492,817,718.31	0.62	0.37	0.24	0.16
2008	309,843,255,706.03	1.34	1.15	0.19	0.78
2009	321,414,678,152.03	0.93	1.18	-0.26	0.03
2010	339,176,756,195.26	0.89	0.88	0.01	-0.30
2011	349,779,012,478.26	0.76	0.72	0.04	-0.16
2012	358,026,610,827.83	0.50	0.93	-0.43	0.21
2013	389,910,755,652.70	0.35	-0.01	0.36	-0.94
2014	398,898,806,331.70	-0.07	-0.34	0.27	-0.33
2015	392,149,409,419.04	-0.22	-0.14	-0.08	0.20
Mean	296,722,887,897.73	0.53	0.52	0.01	-0.05

Note*: The values for 2014 and 2015 are estimates from FEE.

Source: Made by the author following the structure of Andreis (2014).

The last column displays the difference between structural balances and indicates the type of policy used by the state government. It was also used by Schettini *et al.* (2011) and Andreis (2014), who explained that, if the difference is negative, it means the government

¹⁸ As the original data were in index number, the mean of four quarter index numbers should be equal to the annual data.

adopted a policy of expansion, giving up revenues in order to pay its expenditures, while, if positive, this policy taken had focus on contraction, increasing revenues and trying to reduce expenditures. Overall, 7 periods presented expansions and 9 contractions, which might seem that the state favors policies of fiscal contraction. However, a few facts may change this observation. First, the number that goes furthest from the neutral point is -1.27% in 2003. Also, the mean of these differences is also a negative number, so there are evidences of the state working harder on policies of expansions. Importantly, this analysis must be done on the overall result, as analyzing the revenues or the expenditures alone can lead to biases, as many are fixed. Gobetti, Gouvêa and Schettini (2010), who worked with the IMF approach for the federal government, obtained a fiscal contraction from 1998, 1999, 2001-2005 and 2008 (61.54% of their sample), and expansion at 2000, 2006, 2007, 2009 and 2010 (38.46%). Therefore, the state and federal policies are not always conducted the same manner, as 5 years had divergent results, which were 2000, 2003, 2004, 2007, and 2009. This may be due to the fact that the state GDP does not flow the same as the federal does, or that the accounts of both spheres of government follow different cycles.

Some political biases can be identified in these data: elections occurred in the years of 2002, 2008, 2010, and 2014, and 3 of these presented fiscal expansions¹⁹. Moreover, two of these observations presented contractions after the election years, but these may be random effects. A bigger sample would be needed to assess the impact of the elections over the expending and the revenues.

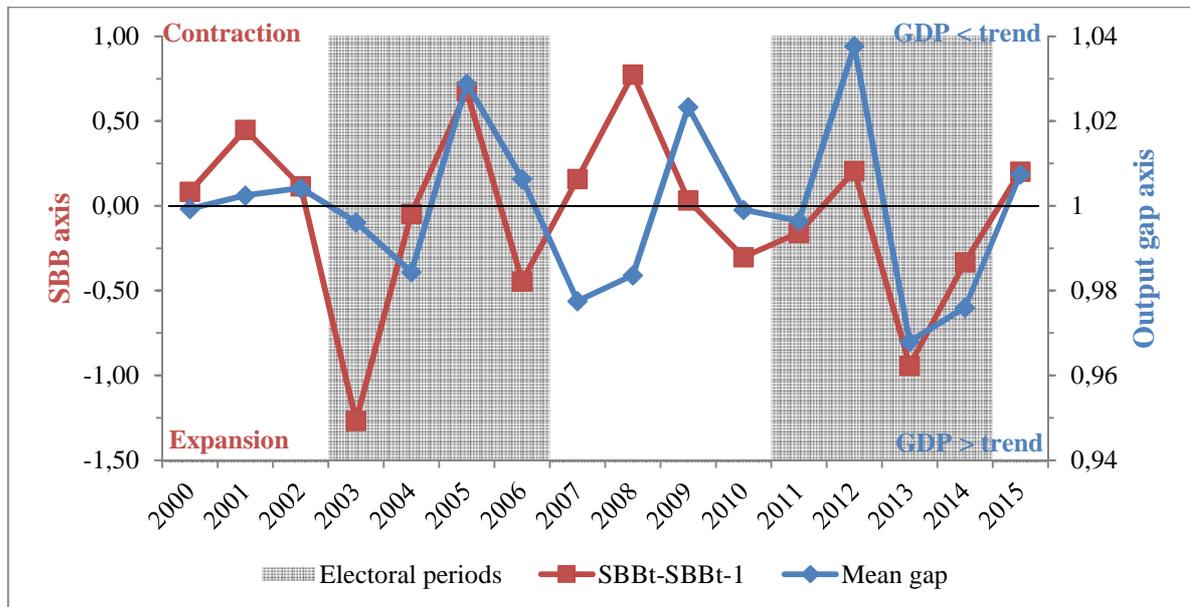
The results so far point out what is the effect of the cycle over the aggregate primary revenue of the state. However, it is not possible to infer the effect of the cycle over each account, or try to discover what revenues are more sensible to this cycle under the approach taken, as it deals with aggregated data. Moreover, there are cyclical components exogenous to the output gap, so the SBB is merely a proxy of the discretionarily of fiscal policy. (GOBETTI; GOUVÊA; SCHETTINI, 2010).

¹⁹ The fiscal responsibility law establishes three limitations to the electoral years. Article 38, b forbids the anticipation of revenues in the last mandate year of the executive branch, article 21, single paragraph forbids the increase of expenditures with personnel within 180 days of the end of the mandate and article 42 forbids the contraction of debts two semesters before the end of the mandate that cannot be fully paid. (BRASIL, 2000). These prohibitions do not invalidate the analysis of political bias in the election years.

4.4 Analysis of the Cycles

This last part will retake the concepts of cycle from Frankel (2011a, 2011b) and Ter-Minissian (2011) in an attempt to congregate the data already presented and to understand how the fiscal policy has been being conducted in relation to the cycles. The quarterly output gap was the original cycle variable, which then had its mean values taken to show the annual gap, and the fiscal policy data were derived from the annual difference between SBB's. These data were organized in Figure 5 the following way: the left axis, which has zero as the central value, brings back the results from the last column of Table 5, where positive values represented a fiscal contraction and negatives ones a fiscal expansion. To the right, with central value as 1, is the output gap, which is the mean of each quarterly value of the $\left(\frac{Y^*}{Y}\right)$ formula. The interpretation is given as, if the GDP cycle is below the trend and the government is making contraction in its fiscal policy in this meantime, then this policy is pro-cyclical. Therefore, if both marks are in the same side of the figure (which is divided by horizontal black line at the center of both vertical axes), then the policy is pro-cyclical. Consequently, for a same time period, if they are in different parts of the graph, then the government is making the fiscal policy go against the cycle, which is the movement advocated by Frankel (2011b).

Figure 5 – Fiscal policy vs. cycle



Source: Made by the author through MS Excel.

In 2000 and 2010 the cycle was very weak, as the gap is almost equals 1, but they have been considered as periods of growth above the trend prior to rounding. Therefore, the fiscal

policy was pro-cyclical in the periods of 2001-2005 and 2009-2015 (75% of the sample), leaving only 2000 and 2006-2008 as counter-cyclical periods (25%). Summing the results so far, this finding is consistent: the state is usually above trend GDP and making stronger efforts in expansionist policies, thus increasing the effect of the cycles (an accurate pro-cyclical movement). However, the subsequent periods of counter-cyclical policies may be related to the political cycles. For this case, Andreis (2014) recommends calculating the correlation between the gap and the stance of the fiscal policy for each period of government and the overall sample. The results of these calculations applied to Rio Grande do Sul were displayed in Table 6, through which only Yeda Crusius's cycle had focused on counter-cyclical conduction of the fiscal policy (and this cycle occurred right during the subprime crisis). Santos (2014) points out that this was a harsh period for the government, as it started with the ICMS revenues compromised due to a tax rate increase but ended up getting better after some stocks from Banrisul were sold. This was evidenced in the estimates: 2008 presented the severest contraction the series, slowly changing to a fiscal expansion in the next years, which seems to follow the explanation of positive investment margins brought by Santos (2014). Olivio Dutra's cycle is the one with the correlation closest to zero, meaning that, although tending to be pro-cyclical, this relation is rather weak and could be turned into counter-cyclical more easily, even though that might be due to the smaller number of observations in this cycle or the lesser quality of the data. As Sartori's cycle comprehends only 1 year, it was not possible to calculate a correlation²⁰, but it can be considered pro-cyclical from the results of Figure 5. Adding his cycle to Tarso Genro's does not change the results of the latter. Overall, the fiscal policy of the state tends to be pro-cyclical within political cycles.

Table 6 – Correlation of fiscal policy within political cycles

Governor	Period	Correlation	Conclusion
Olívio Dutra	2000-2002	0.2377	Pro-cyclical
Germano Rigotto	2003-2006	0.5785	Pro-cyclical
Yeda Crusius	2007-2010	-0.4542	Counter-cyclical
Tarso Genro	2011-2014	0.8869	Pro-cyclical
José Ivo Sartori	2015	NA	Pro-cyclical
Overall result	2000-2015	0.3638	Pro-cyclical

Source: Made by the author.

²⁰ At least two observations in each array of cells are required in order to calculate the correlation. Otherwise, the result will be a division by zero. The formula for correlation in Excel is =CORREL.

These considerations may lead to think that the state government is much more likely to perform pro-cyclical movements, which would be in accordance with the affirmation of Ter-Minissian (2011) that countries from Latin America usually take this kind of action, but it must be remembered that the data in discussion are in the sub-national level. It is advised for the state to work with the expenditure side if it wishes to increase the SBB result, as the expenditures tend to have a higher weight²¹ in the calculation. Some of the suggestions of Santos (2014) may come in handy, which include the reform of the social security system, change the clauses of the debt contract, undergo an administrative reform and review wages that are too high.

It is still necessary to confirm if the state is following the same movements as the federal government, as each stance has autonomy towards its accounts. Andreis (2014) found a relation of 50/50% between the pro-cyclical and counter-cyclical policies between 1998 and 2013, being that the periods of 2000, 2004, 2005, 2007, and 2010-2012 presented results opposite to ours, meaning that 50% of the comparable periods differ from the federal results. Although the overall correlations agree that the movements are pro-cyclical, differences between certain years can be found.

Therefore, one state alone cannot explain well how the national fiscal policy is conducted for two reasons. First, there are 27 states in Brazil, and their participation²² in the national GDP differs not only through time, but among the federal states as well. For example, while the participation of Rio Grande do Sul tends to represent 6% of the national GDP, São Paulo stays around 33%, and other small states, such as Alagoas, Sergipe and Piauí contribute with nearly 0.7% each. Even if the SBB were calculated for every state, their results could still differ from the federal government, not only due to their participation, but because of the constitutional autonomy: each one has their own accounts. The states do not share ICMS revenues between each other, neither do they with the federal government, but they do share with their own municipalities. However, it would still be interesting to replicate this methodology to all other states and compare the results with each other and the federal government, as well as use it to check the impact of the business cycle of the state over bigger municipalities, such as capitals. In a wider context, the cycle of the federal government should

²¹ As the gap tends to be a number smaller than 1, it becomes even smaller when powered to the elasticity of 1.09. The expenditures, however, are not affected by the cyclical adjustment. Thus, a number smaller than 1 multiplies the revenues, while the expenditures are multiplied by 1.

²² The data on the participation of each state in the national GDP can be found at IBGE (2015).

impact the state finances, which impact the municipal finances because the earnings are interconnected.

5 CONCLUDING REMARKS

Right from the beginning of this study, the objective was to analyze the relation between fiscal policy and the business cycle generated by the output gap in the sub-national level. After a description of the literature on cycles, budget and fiscal policy, monthly data were collected from Rio Grande do Sul (2016), a process which took nearly 5 months, removed the intra-budget operations and separated the primary revenues and expenditures from the financial ones in order to calculate the primary result of the state, as this information is only available in a bimonthly frequency in the RREO's of SEFAZ. Analyzing these data, it was found out that that the state had more quarterly primary surpluses than deficits from 1999 to 2015, although successive deficits have been found in 2014 and 2015. In this period, the revenues have had a greater reduction than the expenditures, signaling a possible crisis in the public sector. The highest revenues found were related to personnel and benefits, mostly retirement expenditures, which seem to comply with the analysis done by Santos (2014).

The process of identification of the cycle was conducted according to the IMF approach. The quarterly GDP of the state was used as the output variable and the CF filter was chosen for extracting its trend. No adjustments beyond the output gap were done, and only the primary revenues (excluding shares of revenues and miscellaneous transfers from the federal government) were adjusted to the cycle. The result was a revenue elasticity of 1.0908 and gaps between 0.958 and 1.055, considering that 54.41% of the gaps presented the GDP above the trend. This means that the state has a slight tendency to have extra revenues from the cycle, which, after adjustment, lead to a smaller structural component. While the mean observed primary result is 0.53% of GDP, the mean structural component is 0.52%, meaning that 0.01% is the mean cyclical component. Since this number is positive, it was once again confirmed that the cycle is affecting the primary result positively.

The analysis of the cyclicity of the fiscal policy was conducted through a comparison of the output gap and the difference between SBB_t and SBB_{t-1} . While the state is prone to work in a scenario of contraction, it tends to apply more efforts in policies of expansion and is more likely to conduct pro-cyclical policies, which were identified in of the periods of 2001-2005 and 2009-2015 (75% of the sample). Some political bias was found in the data, as the government tended to make policies of expansion before and during years of election, only to change it in the following year, although a bigger sample will be needed in order to confirm this effect. Moreover, the analysis of political cycles indicated that only the government of Yeda Crusis was counter-cyclical, as the correlation between the mean gap and the SBB difference

between 2007 and 2010. This may be related to the fiscal adjustment of 2007 appointed by Santos (2014).

The comparison of the cyclicity of the state and the federal Government was conducted against the results of Andreis (2014). The results do differ: a relation of 50/50 between pro-cyclical and counter cyclical periods was found for the federal government, the state favors the pro-cyclical policies and there are differences between half of the comparable years, indicating that, in most cases that the federal government was running a counter-cyclical polity (2010-2012 is longest period), the state was doing the opposite policy due to the scenario it was undergoing. Therefore, it is acceptable that states and federal governments may walk in different directions sometimes.

It is advised to replicate this method to other states as well and compare the results against the fiscal stance of the federal government again. Once a wider database is established, the cycle of the federal government may be put inside the cycle of the state government, and the cycle of a state may be put into another, thus creating a complete SBB. Moreover, further studies about the default of the tax payers and the active debt may be required to check the actual weight of default in the budgets.

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GLOSSARY

Active debt: This kind of debt allows the government to charge values that have should have already been paid. It applies for both tax and non-tax revenues and charges high interests.

Annulled unpaid commitments: Translation for *Anulação de restos a pagar*. These are expenditures for which the government had reserved the money to pay until the end of the fiscal year, but no longer needs to pay. Santos (2014) calls these as scriptural revenues, because they appear within the account Other current revenues and don't represent an actual cash entry.

Budget result: The difference between overall revenues and expenditures over a determined period of time. It is the most complete result, as it uses every revenue and expenditure account of the RREO.

Fiscal policy: The process that the government undergoes when managing its fiscal revenues and expenditures. This policy deals with taxes and maintenance of public services.

Fiscal rules: Set of rules determined by the government regarding how the fiscal policy should be conducted, in line with the fiscal responsibility law.

Intra-budget operations: Transactions that happen between institutions of the same governmental level. These can be either revenues or expenditures.

Monetary policy: Decisions made by the government regarding the amount of money that will be circulating in the economy.

Net debt: The difference between non-financial liabilities and assets of the government.

Net current revenue: It is the amount of money that the state has available after fulfilling its legal obligations. It is calculated by subtracting the constitutional transfers to municipalities, the patronal social security contribution, the financial social security compensation, the revenues of Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação (FUNDEB), the ARP and the IRRF from the current revenues. It is available monthly in every RREO.

Nominal result: Representation of how much the net public debt has increased in comparison to the last period.

Non-processed unpaid commitments: Translation for *Restos a pagar não processados*. These are expenditures for which the government had reserved the money to pay until the end of the fiscal year but is not going to make the payment that year. They are called non-processed because they haven't undergone the verification phase yet. For further information on unpaid commitments, Brasil (2014b, p. 113) should be consulted.

Potential output: The value of GDP that would have been reached if the economy were working at its maximum capacity. It is represented by the symbol Y^* .

Primary result: Value obtained by subtracting from the primary revenues the primary expenditures. That way, it is possible to measure the fiscal effort of the government, as financial revenues and expenditures are excluded. This result is commonly known as the savings to pay the debt.

Verification: It corresponds to the second phase of the expenditures, the *liquidação*. During this phase, the government checks if the service provided has ended and was executed correctly, then evaluates if the amount that is being charged for such service is correct. If it is, then the value is forwarded to the payment phase.

White elephant: A building that, after finished, has not been used or has not fulfilled its purpose entirely. For example, a power plant that has never been used and has a high maintenance cost.

APPENDIX A – STATISTICAL RESULTS AND TESTS

The first model estimated was a space-state for extending the quarterly GDP. The variables were PIBANO (annual GDP from 1970 to 2015) and PIBTRI (quarterly GDP from 2002.Q1 to 2015.Q4).

Estimation of the state-space models

	Model 1	Model 2	Model 3	Model 4
C(2)	-	-	-	-
C(4)	1.005606[0.0000]	1.003225[0.0000]	0.984946[0.0000]	1.005606[0.0000]
C(5)	1.005759[0.0000]	1.005941[0.0000]	1.005759[0.0000]	1.006147[0.0000]
C(6)	49.54224[0.0000]	-	4.513721[0.0000]	49.54215[0.0000]
C(7)	2.850764[0.0008]	-	1.047579[0.0003]	5.267064[0.0069]
SV1 – Final state	137.5791[0.0000]	125.4313[0.0000]	119.4611[0.0000]	137.5791[0.0000]
SV1 – Root MSE	2.803585	1.273857	9.603151	2.803584
SV2 – Final state	133.7543[0.0000]	134.5980[0.0000]	133.7543[0.0000]	136.8763[0.0000]
SV2 – Root MSE	1.946223	1.357085	1.946217	2.023521
Akaike	7.672742	23.04608	7.922532	7.72792
Schwarz	7.785348	23.10238	8.035138	7.840526
Hannan-Quinn	7.718108	23.06876	7.967898	7.773286

Source: Made by the author through Eviews 9.

Specification of the state-space models

Model 1	Model 2
@signal pibtri = sv1 + [var=c(6)] @signal pibano = sv2 + [var=1] @state sv1 = c(4)*sv1(-1) + [var=1] @state sv2 = c(5)*sv2(-1) + [var=c(7)]	@signal pibtri = sv1 + [var=1] @signal pibano = c(2)+ sv2 + [var=1] @state sv1 = c(4)*sv1(-1) + [var=1] @state sv2 = c(5)*sv2(-1) + [var=1]
Model 3	Model 4
@signal pibtri = sv1 + [var=1] @signal pibano = sv2 + [var=1] @state sv1 = c(4)*sv1(-1) + [var=exp(c(6))] @state sv2 = c(5)*sv2(-1) + [var=exp(c(7))]	@signal pibtri = sv1 + [var=c(6)] @signal pibano = sv2+ [var=c(7)] @state sv1 = c(4)*sv1(-1)+ [var=1] @state sv2 = c(5)*sv2(-1)+ [var=1]

source: Made by the author through Eviews 9.

The second estimation aimed to find out the output elasticity. The dependent variable was LOGINR (natural logarithm of the index of net primary revenues), which was explained by LOGGDP (natural logarithm of the index of GDP), complemented by dummy variables and the dependent variable lagged. The autoregressive terms acted as a trend for the models, therefore the @trend command would not be significant. Values marked in red indicate a time series problem that was not solved, considering 5% significance.

Estimation of the output elasticity

	Base model	Model 1	Model 2	Model 3	Model AR(1)
C(1)	-2.640507[0.0000]	-0.966558[0.0051]	-1.573445[0.0003]	-1.400110[0.0000]	-1.186657[0.0333]
C(2)	1.609260[0.0000]	0.697610[0.0002]	0.950368[0.0000]	1.090818[0.0000]	1.312260[0.0000]
Std. error	0.058477	0.172965	0.168001	0.143188	0.112663
C(3)	-	0.533870[0.0000]	0.412547[0.0000]	0.250942[0.0040]	-0.85185[0.0005]
C(4)	-	-0.058462[0.0041]	0.073413[0.0001]	-0.77758[0.0000]	0.602807[0.0000]
R ²	0.919837	0.966836	0.95782	0.950468	0.957454
Akaike	-2.657560	-3.545746	-3.345328	-3.235978	-3.296626
Schwarz	-2.592280	-3.414123	-3.212621	-3.102170	-3.165002
Hannan-Quinn	-2.631694	-3.493662	-3.292889	-3.183182	-3.244542
Durbin-Watson	0.879726	2.216421	1.287244	1.470058	2.255096
RMSE	0.062217	0.040425	0.045674	0.042508	0.049667
MAE	0.048278	0.030422	0.035266	0.031271	0.038559
MAPE	0.959398	0.600584	0.698118	0.614303	0.760248
J-B (residuals)	0.493561	1.019610	1.245468	4.856948	0.316524
p-value (J-B)	0.781312	0.600613	0.536476	0.088171	0.863626
LM(1) – p-value	0.0000	0.2707	0.0031	0.0799	0.1412
LM(2) – p-value	0.0001	0.4358	0.0039	0.1658	0.2681
ADF (residuals)	-4.884182[0.0009]	-6.258214[0.0000]	-4.161665 [0.0087]	-4.669337[0.0020]	-9.512136[0.0000]
Heteroskedasticity (p-value)	//				
BPG	0.0029	0.0357	0.0517	0.3779	0.4432
Harvey	0.0361	0.0553	0.0547	0.4425	0.5295
Glejser	0.0032	0.0157	0.0309	0.4741	0.4391
ARCH(1)	0.0752	0.0057	0.0012	0.7093	0.6847
ARCH(2)	0.1272	0.0026	0.0022	0.6318	0.7326
White	0.0119	0.0354	0.0516	0.3737	0.4206

Source: Made by the author through Eviews 9.

Base model: $\text{LOGINR} = C(1) + C(2)*\text{LOGGDP}$ **Model 1:** $\text{LOGINR} = C(1) + C(2)*\text{LOGGDP} + C(3)*\text{LOGINR}(-1) + C(4)*\text{DUM01}$
Method: LS(COV=HUBER)**Model 2:** $\text{LOGINR} = C(1) + C(2)*\text{LOGGDP} + C(3)*\text{LOGINR}(-2) + C(4)*\text{DUM02}$
Method: LS(COV=HAC, COVLAG=2, COVKERN=QUADSPEC)**Model 3:** $\text{LOGINR} = C(1) + C(2)*\text{LOGGDP} + C(3)*\text{LOGINR}(-3) + C(4)*\text{DUM03}$
Method: LS**Model AR(1):** $\text{LOGINR} = C(1) + C(2)*\text{LOGGDP} + C(3)*\text{DUMAR1} + [\text{AR}(1)=C(4)]$
Method: LS(ARMA=EIEWS, OPTMETHOD=LEGACY)

Depiction of dummies and their periods

Dummy name	Periods with dummy=1	Original structural breaks
DUM01	2003Q2-2004Q2	2003Q2
DUM02	2002Q3-2003Q1, 2005Q2-2006Q1, 2008Q1	2003Q1, 2005Q2, 2008Q1
DUM03	2002Q1, 2003Q2-2004Q2, 2007Q1-2008Q2	2002Q1, 2004Q2, 2008Q1
DUMAR1	2001Q4-2002Q2, 2003Q2- 2005Q1	2002Q1, 2003Q2

Source: Made by the author.

Bai-Perron tests of L+1 vs. L globally determined breaks on model 3 before dummy

Breaking variables: C LOGGDP LOGINR(-3)
 Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05
 Allow heterogeneous error distributions across breaks

Sequential F-statistic determined breaks:	0
Significant F-statistic largest breaks:	3

Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	2.876621	8.629864	13.98
1 vs. 2 *	12.87522	38.62566	15.72
2 vs. 3 *	9.721036	29.16311	16.83
3 vs. 4	2.744964	8.234892	17.61
4 vs. 5	0.000000	0.000000	18.14

* Significant at the 0.05 level

** Bai-Perron (Econometric Journal, 2003) critical values.

Estimated break dates:

3: 2002Q1, 2004Q2, 2008Q1

Source: Calculations from Eviews 9.

Bai-Perron tests of L+1 vs. L sequentially determined breaks on model 3 after dummy

Breaking variables: C LOGGDP LOGINR(-3)
 Non-breaking variables: DUM03
 Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05
 Allow heterogeneous error distributions across breaks

Sequential F-statistic determined breaks:	0
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Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	3.352715	10.05815	13.98

* Significant at the 0.05 level.

** Bai-Perron (Econometric Journal, 2003) critical values.

Source: Calculations from Eviews 9.

Descriptive statistics of the IGDP trend series (quarterly)

	IGDP	IGDP_HP	IGDP_CF	IGDP_D12
Mean	124.3176	124.3176	124.1814	124.3685
Median	122.5849	122.3418	121.4528	124.1531
Maximum	153.427	148.6422	149.4644	151.4732
Minimum	99.92952	99.90672	99.33627	100
Std. Dev.	16.44118	15.97842	15.93988	16.27534
Skewness	0.203905	0.131279	0.137152	0.182625
Kurtosis	1.706604	1.59805	1.57805	1.682337
Jarque-Bera	5.211017	5.764134	5.942024	5.297324
Probability	0.073866	0.056019	0.051251	0.070746

Source: Made by the author though Eviews 9.

APPENDIX B – DESCRIPTION OF THE ACCOUNTS AND INSTITUTIONS

Groups of primary revenues and expenditures

Revenues	
Tax revenues	<p>ICMS is the tax on commercialization of merchandise and services. It was created by the article 155, II of the Federal Constitution and is regulated by the state decree number 37,699. The normal tax was 17% of the sale price until 2015, and got changed to 18% in 2016. However, some superfluous products, such as alcoholic beverages, guns and cigarettes have a rate of 25% (30% in 2016) and basic food items, such as rice, beans, fruits and potatoes have a rate of 12%.</p>
	<p>IPVA is the tax paid for the ownership of a motor-vehicle. The Federal Constitution allows the states to charge this tax according to article 155, III, and Rio Grande do Sul does so through the law 8,115 and the decree 32,144. It is levied upon the current value of the vehicle and the tax rates are 3% for common cars, aircraft and ships for leisure, sports and racing, 2% for motorcycles, and 1% for vehicles from rentals (art. 11).</p>
	<p>ITCD is the tax due when transferring the patrimony of the dead, as during the inheritance process, and when making donations. It was created by the article 155, I of the Federal Constitution and is regulated by the decree 33,156. It is calculated using the market value of the goods that are being transferred (art. 14), under a tax rate of 4% (art. 22).</p>
	<p>IRRF is the withholding income tax. Normally, income taxes belong to the federal government; however, the article 157, I of the Federal Constitution allows the states to keep the revenues from IRRF generated by the employees of their authorities and institutions. One important note is that this tax is ranged in tiers, which means that the tax rate varies from 0 to 27.5% depending on the person's monthly income. Until December of 2002, only an additional rate of the income tax was added to the state revenue. This rate is defined by law 8,792/1988 and consists of 5% over profits and capital gains.</p>
	<p>ITBI is a municipal tax charged when transferring the ownership of an estate between living people. The state only gets the tax when the taxing event occurred before October 6th, 1988, that is, one day prior to the change in the Federal Constitution that made this a municipal tax. This tax is foreseen at article 156, II of the Federal Constitution and its rate varies according to the municipality the estate is located. In Porto Alegre, for example, the rate is 3% of the value calculated by the municipal finances office.</p>
	<p>Fees are the values paid by the people in order to acquire public services. Some examples are the fees for joining a lawsuit, exercising the police power, public security fees, administrative services and evaluation of goods.</p>
Contributions	<p>Contributions are paid by pensioners and active and inactive civil servants of the state in exchange of health plan provided by IPERGS and the retirement plan. Only RPPS, FAS and IPERGS receive social contributions. According to the complementary law 13,758/2011, the rate to be paid is 13.25% of the salary, but it used to be of 11% before 2012. The subscription to the health plan is mandatory and the rate is of 7.2% of the salary, as</p>

	determined by complementary law 12,134/2005, but complementary rates may be charged per dependent of the insured employee.
Real estate revenues	This group of revenues is quite wide. It contains the revenues from rents, remuneration from financial investments, dividends and values paid for using public utility goods, that is, concessions and permissions.
Agricultural revenues	Generally, this group can contain any account related to agriculture, animal raising and flowers. It is divided into production of vegetables and animal produce and derivatives. The revenues of the direct administration come from the action of development funds, such as Fundo Estadual de Apoio ao Setor Primário (FEASP), Fundo de Desenvolvimento Florestal (FUNDEFLOR), Fundo Estadual de Saúde (FES) and the penitentiary fund. IRGA sells lumber and rice, while FEPAGRO and FZB have unbound revenues.
Industrial revenues	Revenues from the transformation of goods and constructions. Some subgroups include the sales of pharmaceutical and veterinary products, printing (newspapers and magazines) and manufacturing of foodstuff. IRGA processes rice, the direct administration publishes the official judicial press and manages some funds, while other institutions present unbound revenues in this group.
Services revenues	The services are subdivided into commercial, transport, health, lottery and administrative, agricultural, registries, airport tariffs, port services, warehouse services and development funds. Some examples include the technical and scientific services from Cientec, tickets for cultural events (presentations by FOSPA and drama presentations at FTSP and the zoo managed by FZB), subscription for admission tests, researches made by FEE and media services provided by TVE.
Current transfers	Transfers may come from other stances of government (federal government or municipalities) through funds such as FPE and other shares of revenues (IPI and CIDE), compensation for the use of natural resources, transfers from Sistema Único de Saúde (SUS), the ICMS payback from complementary law 87/1996 (Kandir Law), and others. Transfers may also come from other states and municipalities, education funds, private institutions, from abroad or common people. A transfer commonly found is the one that comes from agreements with municipalities and the federal government.
Other current revenues	Revenues that do not fit the previous groups fall into this one. This includes interests from taxes, compensations and restitutions, revenues from the active debt and its interests and miscellaneous revenues, such as lawsuit charges, attorney fees, sales of waste and scrapped paper, and the annulled unpaid commitments.
Capital transfers	Transfers from people and other institution that will be used to increase the amount of capital of the state. This capital must have a specific destination and is generally used with investments.
Other capital revenues	General capital revenues that are not related to the sale of capital goods or acquisition of credit. Two examples were found: internalization of the assets of extinguished controlled companies and inheritance in abeyance.
Deductions from the current revenue	Tax revenues, transfers and other current revenues must have a share deducted and transferred to FUNDEB. The article 212 of the Federal constitution requires that at least 25% of these revenues invested in

	education; however, the state constitution puts a higher value under article 202: 35%.
Expenditures	
Payroll and benefits	All the expenditures with human resources, both active and inactive, are directed to this account. This includes wages, pensions, retirement payments, patronal contributions and benefits such as the 13 th salary, allowances, overtime, life insurance, and gratifications.
Other current expenditures	Generic expenditures which are related to the offer of public and social services. They are divided into transfers to the municipalities and others, which include expenditures like consumables (cleaning materials, uniforms, kitchen gas, office materials), fuel, advertising material, third-party services (electric energy, water and sewage, periodicals, informatics), consulting services, scholarships, and compensations.
Investments	Constructions and renovations, projects, asphalt paving, acquisition of machinery, equipment and software, weaponry, other infrastructural investments.
Financial investments	Translation for “ <i>Inversões financeiras</i> ”. These accounts are for acquisition of properties and capital goods already in use, constitution of capital, banking operations and insurances. For the primary result, the loans granted are removed from the calculation.

Source: Concepts from Brazil (2014b) and Rio Grande do Sul (2012).

Institutions that are part of the budget of Rio Grande do Su

Initials	Name of the institution	Period
Adm_direta	Administração direta	1999-2015
Agdi	Agência Gaúcha do Desenvolvimento e Promoção do Investimento	2011-2015
Agergs	Agência Estadual de Regulacao dos Servicos Públicos Delegados do Rs	1999-2015
Cientec	Fundação de Ciência e Tecnologia	1999-2015
Daer	Departamento Autônomo de Estradas de Rodagem	1999-2015
Detran	Departamento Estadual de Trânsito	1999-2015
Faders	Fundação de Articulação e Desenvolvimento de Políticas Públicas para Ppd e Ppah	1999-2015
Fapergs	Fundação de Amparo a Pesquisa do Estado do Rio Grande do Sul	1999-2015
Fas_Rs	Fundo de Assistência à Saúde	2009-2015
Fase	Fundação de Atendimento Sócio-educativo do Rio Grande do Sul	2002-2015
Tve	Fundação Cultural Piratini - Rádio e Televisão	1999-2015
Fdrh	Fundação para o Desenvolvimento de Recursos Humanos	1999-2015
Febem	Fundação Estadual do Bem Estar Menor	1999-2001
Fee	Fundação de Economia e Estatística Siegfried Emanuel Heuser	1999-2015
Fepagro	Fundação Estadual de Pesquisa Agropecuária	1999-2015
Fepam	Fundação Estadual de Proteção Ambiental Henrique Luis Roessler	1999-2015
Fepps	Fundação Estadual de Produção e Pesquisa em Saúde	1999-2015

Fetlsv	Fundação Escola Técnica Liberato Salzano Vieira da Cunha	1999-2015
Fgtas	Fundação Gaúcha do Trabalho e Ação Social	1999-2015
Figtf	Fundação Instituto Gaúcho de Tradição e Folclore	1999-2015*
Fospa	Fundação Autárquica Orquestra Sinfônica de Porto Alegre	1999-2015
Fpergs	Fundação de Proteção Especial do Rio Grande do Sul	2002-2015
Ftsp	Fundação Teatro São Pedro	1999-2015
Fundergs	Fundação de Esporte e Lazer do Rio Grande do Sul	2002-2015
Fzb	Fundação Zoobotânica do Rio Grande do Sul	1999-2015
Ipergs	Instituto de Previdência do Estado do Rio Grande do Sul	1999-2015*
Irga	Instituto Riograndense do Arroz	1999-2015
Metroplan	Fundação Estadual de Planejamento Metropolitano e Regional	1999-2015
Rpps Rs	Regime Próprio de Previdência Social do Estado do Rio Grande do Sul	2009-2015
Superint_PH	Superintendência de Portos e Hidrovias	1999-2015
SupRG	Superintendência do Porto de Rio Grande	1999-2015
Uergs	Universidade Estadual do Rio Grande do Sul	2001-2015

*Ipergs did not have revenues in 1999, and Figtf did not have any revenues in 2006. However, both institutions had expenditures these years.

Source: Made by the author with data from Rio Grande do Sul (2016).

APPENDIX C – DATA COLLECTION PROCEDURES

Collecting the data on revenues took roughly four months, as there were no aggregate data available. The process consisted of copying and pasting the monthly accrued data of each institution of the state (direct administration, institutions and autarkies) in an extensive Excel spreadsheet. Then, the main accounts were extracted with the VLOOKUP formula and IFERROR change the #N/A to zero, and intervals¹ were created for each institution in each time period, in order to organize the formulas.

Collecting the expenditures was simpler and took one month, as the Real-time public finances tool has them available as an aggregate. This search was made using the options of monthly data, *Adm. Direta/Fundacoes/Autarquias* as the entity and *Grupo de despesa* as the first outspread and *Natureza despesa elemento* as the second. Only the group accounts and the major accounts in the **other current expenditures** group were copied and pasted in a new Excel spreadsheet, which included Distribution of revenues, Retirements, Pensions, Consumables, and Other third-party services. This specific outspread also allowed identifying the Intra-budget operations, which showed up as the last accounts of the groups Personnel and Social Charges and Other current expenditures. According to Brasil (2014b), these operations started being used in 2007 with the purpose of eliminating double counting, therefore, in order to differentiate the intra accounts from the budget ones, the monthly values of each account had to be summed until they were equals to the total bimonthly values that are published in the RREO's.

Both revenues and expenditures were then consolidated into another Excel spreadsheet for conversion of the accrued data into pure monthly values

¹ Examples: Adm_direta_2015.M01, CIENTEC_1999.M12.