FUCAPE FUNDAÇÃO DE PESQUISA E ENSINO

EDVAN SOARES DE OLIVEIRA

AGGREGATE ACCOUNTING DATA AND ECONOMIC ACTIVITY

VITÓRIA
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Tese apresentada ao programa de Doutorado em Ciências Contábeis e Administração da Fucape Fundação de Pesquisa e Ensino, como requisito parcial para obtenção do título de doutor em Ciências Contábeis e Administração.

Orientador: Prof. Dr. Fernando Caio Galdi

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Aos meus pais,
Marleides Moreira Soares
e Rubens de Oliveira.

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RESUMO

Na tomada de decisão em relação ao orçamento público e à política econômica, é relevante considerar a taxa esperada de crescimento do PIB em datas subsequentes. A literatura mostra que os dados agregados quando não incorporados nas previsões econômicas geram erros nessas estimativas. O estudo tem como objetivo verificar como os dados contábeis agregados transmitem informações sobre a atividade econômica futura. A pesquisa está dividida em três capítulos principais, segmentados em três abordagens: O primeiro capítulo testa o efeito dos lucros agregados e dos fluxos de caixa como preditores da atividade econômica. Segundo, verifico se o impacto desses dados na economia é mais representativo quando um país adota as IFRS. O objetivo do terceiro capítulo é verificar se a demonstração de valor adicionado transmite informações para as previsões da atividade econômica e se sua informatividade é maior que as das medidas de lucros, dada a sua relação com a definição do PIB. Os resultados mostram que os lucros agregados são informativos sobre a taxa de crescimento real do PIB para um grupo de 78países. Mais especificamente, o lucro operacional tem um impacto mais forte na taxa de crescimento do que outras medidas de lucros agregados. Os resultados também indicam que o fluxo de caixa é o componente dos lucros que podem prever a atividade econômica. Os accruals, pelo contrário, não têm a mesma capacidade devido à sua subjetividade, esse resultado pode estar relacionado ao fato de alguns accruals não estarem envolvidos no processo de produção das empresas. Constatei um aumento na informatividade dos ganhos agregados sobre o PIB para países que aderem aos padrões internacionais de contabilidade e um aumento na informatividade dos accruals. O terceiro artigo utiliza a configuração brasileira em que a Demonstração do Valor Adicionado (DVA) é obrigatória e mostra que o valor adicionado agregado transmite informações sobre a atividade econômica e essa métrica tem o maior impacto no crescimento do PIB (comparado a lucros agregados e fluxos de caixa agregados). Assim, os reguladores em todo o mundo devem considerar a adoção obrigatória do VAS para beneficiar o ambiente de informações. Juntos, os resultados contribuem para o fluxo de literatura que estuda a previsibilidade dos dados econômicos e mostra a relevância dos dados contábeis agregados como preditores do crescimento do PIB. Essa relação é mais forte para os países que adotaram o IFRS e os dados mais informativos sobre

crescimento econômico estão em uma demonstração contábil que não é obrigatória em vários países do mundo.

Palavras-chave: Dados contábeis agregados, Atividade econômica, Lucros, IFRS, Demonstração do Valor Adicionado

ABSTRACT

On decision making regarding public budget and economic policy, is relevant to consider expected GDP growth rate on subsequent dates. The literature shows that aggregate data when not incorporated in economic forecasts drives errors in these estimates. The study aims to verify how aggregate accounting data conveys information on future economic activity. The research is divided into three main chapters, separating into three approaches: The first chapter tests the effect of aggregate earnings and cash flows as predictors of economic activity. Second, I verify whether the impact that these data has on economy are more representative when a country adopts IFRS. The third chapter objective is to verify if value added statement conveys information for economic activity forecasts and if its informativeness is greater than earnings measures, given its relation to GDP definition. Results show that aggregate earnings are informative about real GDP growth rate for a group of 78 countries. More specifically, operating income has stronger impact on growth rate than other aggregate earnings measures. The results also indicate that cash flow is the component of earnings that can predict economic activity. Accruals, otherwise, does not have the same capacity due to its subjectivity, this result may be linked to the fact that some accruals are not directly involved in the firms' production process. I found an increase in the informativeness of aggregate earnings on GDP for countries that adhere the international accounting standards and an increase in informativeness of accruals. The third paper uses the Brazilian setting where the Value Added Statement (VAS) is mandatory and shows that the aggregate value added convey information about economic activity and this metric has the greatest impact on GDP growth (compared to aggregated earnings and aggregated cash flow).Thus, regulators worldwide should consider VAS mandatory adoption in order to benefit the information environment. Taken together the results contribute to the stream of literature that study predictability of economic data and shows the relevance of aggregate accounting data as a predictor of GDP growth. This relation is stronger for countries that adopted IFRS and the most informative data on economic growth is in an accounting statement that is not mandatory in several countries around the world.

Keywords: Aggregate accounting data, Economic activity, Earnings, IFRS, added value statement

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1 INTRODUCTION

In recent years, research has been conducted verifying whether the inclusion of aggregate accounting data in predictions of economic parameters makes it more assertive (Konchitchki and Patatoukas, 2014; Gallo et al., 2016). Literature indicates that aggregate earnings are informative about future economic activity (Konchitchki and Patatoukas, 2014) and interest rates implemented with monetary policies (Gallo et al., 2016). Konchitchki and Patatoukas (2014) argue that GDP can be measured from production perspective, which leads to the statement that aggregate earnings can compose a good proxy for a country's domestic product.

Konchitchki and Patatoukas (2014) affirm that making coherent forecasts about economic activity is important because these estimates are used to carry out the federal budget, make economic policies decisions, forecast unemployment rate, and inflation. It is important to note that the need for forecasting is linked to disclosure delay of real information. The authors also show that not using accounting data in an aggregate way increases errors in forecasting GDP growth. Such results can be justified by Fischer and Merton (1984) who claim that firms' earnings make up an important GDP component and might be associated with other product elements.

Konchitchki and Patatoukas, 2014 and Gallo et al., 2016 use earnings before extraordinary items as a performance measure to verify whether aggregated accounting data is informative about economic parameters. However, Martanti, Mulyono and Khairurizka (2009) show that earnings components that are not related to operations, reduces the association between firms' earnings and returns. In this senseoperating earnings can measure firm's performance with lower noise. This

evidence leads one to believe that operating earnings are more informative about future economic activity than other earnings measures.

From a microeconomic perspective, a frequently studied topic is balance sheet accounts subjectivity. Richardson et al. (2005) affirm that subjectivity comes from accruals and its uncertainty is linked to the ability for one to revert to cash in the future. The authors also show that different components, with different levels of subjectivity, have different persistence within earnings. More specifically, it was pointed out that more subjective components have less persistence in earnings, indicating that the ability to maintain future earnings is more strongly associated with less subjective components. In addition, there are accruals that are not linked to production, which means that the calculation of GDP is not associated to the accrual regime. Thus, if aggregate earnings explain future growth rate, cash flow is expected to be the earnings portion that has the greatest impact on economic activity.

The International Financial Reporting Standards (IFRS) adoption by various countries raised questions regarding changes in accounting information quality. Some research evidences an increase in accounting information quality due tointernational convergence (Ashbaugh and Pincus, 2001; Barth et al., 2008; Landsman et al., 2012; Gao, Jiang and Zang, 2019; Ray, 2018, Levitt, 1998; Christensen et al., 2015). However, little is discussed over this improvement in terms of accounting data predictive capacity in relation to economic parameters. It is expected that this increase in information quality makes the relation between accounting and economic data even more evident.

In addition to traditional earnings metrics from income statements, we also focus on Value Added Statements (VAS) numbers, defined by De Luca (1998) as an accounting report whose purpose is to measure the wealth value generated by

entities, as well as how this wealth is distributed among parties that contributed to value generation. For Meek and Gray (1988) the statement provides information not only for shareholders, but for all stakeholders. The literature has pointed to the concept similarity between VAS and GDP (De Luca, 1998; Santos and Lustosa, 1998). De Luca (1998) affirms that it is possible to calculate GDP from VAS content by measuring value added in different sectors (financial, trade and service). In the same context, Santos and Lustosa (1998) say that the distribution of value added among agents that generate this income is equivalent to national income concept, stating that the transformation of intermediate resources into final consumer goods only occurs due to the use of production factors. The fact that the VAS numbers are closely linked to GDP leads one to expect a greater relation of this data with economic parameters.

This present study has three main chapters, which contain objectives aiming to test aggregate accounting data informativeness on GDP growth rate using different aggregate accounting metrics in different situations. Chapter 2 aims to analyze whether the relation found between aggregate earnings and economic activity (as studied in American market) is also true when considering a group of countries. Specifically, it is also verified whether aggregate operating profits have a greater impact on GDP growth rate when compared to the effect of other earnings measures. In addition, in this chapter, it is tested whether the components of earnings (cash flow and accruals) have impacts of different sizes on economic activity.

The third chapter seeks to analyze whether IFRS adoption increases aggregate accounting data informativeness on GDP growth rate. It is intended to analyze whether the impact that aggregate data has on economic growth is more

evident in countries that adopted IFRS, since there is evidence of improved accounting information brought by IFRS adoption. This same improvement is the background to the second question in the chapter, which aims to answer whether standardization tends to reduce the existing difference in accruals and cash flows informativeness on real GDP growth.

The fourth chapter makes an analysis only for Brazilian market using data from value added statements. It is also intended to analyze whether the statement metrics, more specifically gross and net added value, impact economic activity in Brazil. In addition, I verify whether value added has a greater impact on economic activity when compared to other metrics in the study (net income, operating income, and cash flows), since the figures in this statement are more closely linked to GDP definition than any other measure used (De Luca ,1998; Santos and Lustosa, 1998).

The study is relevant due to the importance of consistent forecasts which are considered in federal budget development, as well as in decision-making moments regarding public policies and investments. Evidencing accounting variables relevance to economic activity can be a redirector of forecasting mechanisms. Expanding studies already done on accounting data informativeness, and the effect of different metrics in different situations is relevant for GDP growth prediction and regarding the use of statements that may contain information highly relevant to forecasts.

The paper differs from the existing literature in the globalization of study and in the flexibility of the metrics adopted. Konchitchki and Patatoukas, (2014) verify the relationship between aggregate accounting variables and economic activity for the American market, here, I expand the study by analyzing a total of 81 countries, which allows one to verify whether the relationships found remain consistent from a global perspective. The verification of different accounting metrics as predictors of economic

activity allows a comparison of their explanatory power, which helps in making decisions about which data to use in the forecast. Therefore, I say that the biggest contributions of the research are in the expansion of the study in relation to the data covered by the literature and the comparison between the metrics adopted in the GDP forecasts.

The results of the study point toward the idea that aggregate earnings are informative about future economic activity, especially that aggregate operating income is the earnings measure that has the greatest impact on future GDP growth. It is also shown that, among earnings components (cash flows and accruals), only aggregate cash flows are informative on real GDP growth rate, which is linked to the existing accruals subjectivity.

The third chapter reveals that aggregate earnings informativeness on real GDP growth rate is enhanced in countries that adopted IFRS, which is explained by accounting information improvements brought by the adoption. It is still evident that the difference between accruals and cash flow impacts are reduced by accounting information improvement.

The fourth chapter shows that, in the Brazilian market, VAS metrics are informative about economic activity. The aggregate accounting variables used in previous chapters are also addressed and verified for Brazil and are also informative about economic growth up to four quarters ahead. However, value added effects on economic activity are greater than the effect of all other aggregate accounting metrics.

Together, these results show that accounting data is an important predictor of economic activity. This reality expands in relation to Konchitchki and Patatoukas (2014) study, showing that aggregate metrics explain economic growth around the

world. It is still evident that using accounting data for GDP forecasting makes more difference in countries that are ruled by IFRS. Moreover, the results expose that value added, as found in the VAS, is the metric with the greatest impact on economic activity, which is a signaling of this statement relevance, since the vast majority of countries around the world do not use it.

2 AGGREGATE EARNINGS AND ECONOMIC ACTIVITY: A CROSS COUNTRY ANALYSIS

2.1 INTRODUCTION

Recent research shows that current aggregate accounting data conveys information about future economic data (Gallo et al.,2016; Konchitchki and Patatoukas, 2014). The authors highlight the fact that there is little use for accounting data for any kind of economic forecast, even if it is highly informative about economic parameters.

When analyzed at companies' level, the literature has developed considerably with respect to informativeness of accounting data (Beaver, 1998; Kothari, 2001, for example). However, at macroeconomic level, Konchitchki and Patatoukas (2014) claim to be an underexplored field. Further, the authors find evidence for the fact that macroeconomic analysts do not incorporate aggregate earnings metrics into their predictions drives an increase of forecast errors in economic growth future rates. Nevertheless, Zarnowitz and Braun (1993), as well as Stark (2010) show that macroeconomists' predictions surpass time series models.

Konchitchki and Patatoukas (2014) state that GDP is the main measure of a country's economic performance and activity and is also the most relevant when it comes to economic growth. Additionally, they also emphasize the importance of its forecast for reasons associated with the preparation of federal budget, for the formulation of monetary policy and employment and production forecasting.

The authors also affirm that when an income perspective is used to measure GDP, it can be calculated as the sum of corporate profits, employee profits, imports, and taxes on production. According to them, even though accounting earnings are

different from taxable earnings and do not include earnings from privately held companies, the aggregate accounting earnings metric is an appropriate proxy for corporate profits.

When a company's performance needs to be evaluated, a common metric is earnings. It is quoted by Kothari (2001), as a motivator of research on informational capacity of earnings, the fact that it is used in various asset pricing models such as the model developed by Ohlson (1995). However, according to Ribeiro, da Silva Macedo, and da Costa Marques (2012), this measure is not always able to reflect the performance of firms. The authors point out interest coverage as the main performance measure, that is linked to the company's ability to make interest payments provided for in contracts. Hendriksen and Breda (1999) claim that the association between profits and prices is imperfect and is justified by the fact that prices reflect a much broader set of information than earnings. For De Souza and Galdi (2013) the concern associated with earnings measurement errors as a predictor of performance is at the discretion of senior managers regarding the accruals[1] component.

The literature has discussed earnings management aspects such as corporate governance and profit quality (Barros et al., 2013; Bistrova and Lace, 2012; Elghuweel, 2017; Martinez, 2008; Waweru and Riro, 2013). For example, Martinez (2008) declared that there is no problem in accrual accounting, but there are issues with the discretion of managers when computing this measure. This metric has been named discretionary accruals, which are commonly accepted as a proxy for earnings management. Thus, there may be a subjectivity in the measure of earnings when companies contract a larger number of accruals. Thus, according to the author, such

[1]Dechow and Dichev (2002) define accruals as temporary adjustments that bring differences between earnings and cash flow.

subjectivity can make earnings an unreliable metric for measuring company performance.

For Richardson et al. (2005) the subjectivity of the accrual component is linked to its ability to reverse cash in the future, which indicates that such characteristics may be associated with the possibility of financial statement manipulation, based on this earnings component. For example, allowance for doubtful accounts (as known as bad debt) is an accrual that is defined according to managers' choices, so it shows subjectivity and, consequently, little confidence. Thus, as mentioned before, there are several other accrual components depending on the discretion of the manager. There is empirical evidence revealing different levels of persistence in profit components, more specifically in accruals. Richardson et al. (2005) show that components with different levels of subjectivity have distinct persistence within earnings. These results were found for an American database.

GDP is the sum of production of all goods and services within a country over a given period. Analyzing from a microeconomic perspective, not all accruals of a company are linked to its production, for example, installment sales, an accrual not linked to production in current period, but simply realizing the sale of that good or service. There is a part of accruals that is not directly linked to production and, consequently, is not linked to the calculation of GDP, which means that GDP is not linked to the accrual regime which is adopted by firms.

Feltham and Ohlson (1995) argue that market value may not vary widely in financial transactions. However, large variations may come from the value of transactions, and the authors also state that market value can be defined as the net present value expected of future abnormal earnings. One of the most important conclusions of his paper is that the growth rate of accounts that are a part of a firm's

operating activity is relevant, but only in cases where accounting standards are considered conservative.

Martanti, Mulyono and Khairurizka (2009) find evidence in their studies, which is to verify whether company size and operating cash flows affect stock return, and that the non-trading portion of the profit reduces the existing association between firms' earnings and returns, thus showing that the operational component actually prices firms.

I suppose that cash flows are part of earnings, which, when combined, have a greater explanatory power on GDP growth. In addition, if operating profits can more clearly, and objectively predict corporate value, I expect that this metric, when aggregated, conveys more information about economic activity as compared to other profit measurements.

The purpose of this chapter is to verify whether aggregate earnings convey information about GDP growth in various countries. In addition, I want to check whether there is a difference between the predictive power of cash flow and accruals aggregate components, as well as aggregate operating earnings with other profit metric. For tis reason, I use three earnings metrics in aggregation. In order to obtain the explained objective, other than operating earnings, I use net income for cash flow comparison and profit before extraordinary items[2] as already used in previous literature (Gallo et al., 2016; Konchitchki and Patatoukas, 2014).

In order to achieve these goals, models will be estimated where the dependent variable is the GDP growth up to two periods ahead and the independent present

[2]Defined by Martins et al. (2008) as earnings after including extraordinary gains and losses. According to the author, extraordinary events are occurrences that does not follow the firm's ordinary routine but is directly linked to the company's main activity.

aggregate earnings growth (for the three different profit metrics mentioned before). Additionally, I analyze not only if aggregate accounting information is linked to economic activity, but how many years ahead present earnings information affects GDP growth and whether operating profits are more predictive of economic growth than other metrics. Moreover, the present GDP growth is added to the model along with a variable that captures whether the country is an emerging economy, in order to analyze whether the aggregate accounting information conveys any information in addition to the present economic activity itself for future growth. Finally, the same analysis is repeated, not using aggregate earnings, but rather with the aggregate accruals and cash flow components.

The results indicate that the different earnings metrics convey relevant information about the forecast of economic growth, in particular, operating profits, which, as expected, strongly affects the GDP growth rate. However, when this metric is divided between accruals and cash flow, both aggregates, only the cash flow component is relevant in forecasting future GDP, showing that this is the part of profit that bears information about the economy.

This work is justified by the relevance of making coherent predictions about economic growth. This indicator works as one of the determinants of monetary policy in countries, as well as a determinant of public budget. As affirmed by Konchitchki and Patatoukas (2014), macroeconomic analysts do not incorporate aggregate accounting information into their forecasts, which has proven to be an important predictor of economic growth. Showing that accounting information is linked to economic activity can be used as a forecasting mechanism redirector. Consequently, knowing if the less subjective accounting metric has the greatest predictive power over GDP growth, and which earnings measures are the most predictive of economic

activity, can also help decide which aggregate metric should be incorporated into the forecast.

The chapter shows an expansion of the literature in relation to the sample size, based on a global analysis, and the flexibility of the accounting metrics that can be used in the forecast. The verification of different accounting metrics, as predictors of economic activity, in turn, allows a comparison of their explanatory power, which helps in making decisions about wat data to use in the forecast.

This chapter is divided into 4 more sections. Initially, the prior literature and hypotheses development seeks to make a general overview of the literature on the subject. This section is divided into a section on economic activity and aggregate earnings**,** a section about accounting metrics, and a forecast made under a microeconomic scope. Sub sequentially, I presented the research design, which describes the models and statistical data treatments that are used in order to achieve research objective. There is then a section of results that indicates model's estimation. Finally, I conclude this investigation.

2.2 PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT

2.2.1 Economic activity and aggregate earnings

Konchitchki and Patatoukas (2014) show, in their studies on forecasting future economic activity as a function of present aggregate earnings, that GDP is the main and most important metric for measuring economic activity. Henderson et. al (2012) add that is the most relevant variable regarding economic growth. The authors also comment about the importance of an adequate GDP forecast, which is used by the White House and the US Congress for as federal budget premises, as well as the monetary authority for consistent public policy making. The authors also say that, because GDP is also calculated according to an income approach, accounting earnings, when aggregated, can be a plausible proxy for a country's economic activity over a given period. The main conclusion presented by the authors is that aggregate earnings growth conveys information about future GDP expansion. Moreover, they show that this predictive power is incremental to that which is explained by the country’s economic activity.

Two facts are mentioned as the main reasons for sustaining those findings regarding the predictive capacity of aggregate profits related to economic growth. Fischer and Merton (1984) claim that corporate earnings take place as an important component of GDP and these earnings are linked with other elements of GDP.

According to Gallo et. al (2016) the possibility of forecasting economic activity from aggregate earnings allows us to affirm that the accounting metric conveys information about interest rates adopted by the monetary authority. This outcome

was discovered through the inverse relation found between profits and returns in an aggregate perspective (Kothari et al., 2006; Cready and Gurun, 2010).

Thus, the first hypothesis of the study:

H1a: Different aggregate earnings metrics convey information about countries' economic growth.

2.2.2 Accounting metrics and forecasting under microeconomic scope

Feltham and Ohlson (1995) model the relation between firms' market value and accounting data on their operating and financial activities. The authors state that market value may not change due to financial transactions. However, there is considerable variation when it comes to the value of trades. One of the most relevant conclusions of the paper is that the growth rate of the accounts that are a part of operating activity are important only in cases where accounting is considered conservative.

Martanti, Mulyono and Khairurizka (2009), in research that examines whether company size and operating cash flows affect stock returns, find evidence that the non-trading portion of the profit reduces the existing association between firms' earnings and returns. This inference shows that the operational component is the one that, in fact, prices firms. The literature focused on aggregate data (Gallo et al., 2016; Konchitchki and Patatoukas, 2014) uses extraordinary earnings as the accounting metric for aggregating and forecasting GDP growth rate. Thus, the second hypothesis of the study is given by:

H2a: Aggregate operating earnings conveys more information about economic activity when compared to other earnings metrics.

Accounting earnings are subject to manipulation. This possibility of earnings management is given from the discretion of managers in time recognition of some accounts, in which have gaps in relation to accounts' magnitude (Bartov, 1993; Burgstahler and Dichev, 1997; Martinez, 2008; Dechow, Sloan and Sweeney, 1995; Karamanou and Vafeas, 2005).

One common accrual metric is the change in net working capital, that Sloan (1996) used to prove that accruals are less persistent than cash flows as components of earnings. The author attributes this difference to the higher subjectivity of accruals when compared to cash flow – a measure of performance that impacts profit over the same period. Accruals are subjective measures impacting earnings because they consider future cash flow estimates. Sloan (1996) showed as a result that earnings are less persistent when accrual is high or low beyond a normal level.

Richardson et al. (2005), otherwise, expanded Sloan's (1996) accruals determination model relating profit persistence with accrual reliability and its implications having been formally modeled. The tests employed an accrual rating in which each category is evaluated based on its reliability. For Richardson et al. (2005) the subjectivity of accruals is linked to the possibility of future cash reversal, which indicates that this subjectivity can be associated with the possibility of manipulating the financial statements from this component.

The results provided by Richardson et al. (2005)'s studies reveal that more reliable accruals lead to greater persistence when compared to accruals with a high level of subjectivity, which means low reliability. These results suggest that there are significant costs associated with less reliable incorporation of accruals in the financial statements. Furthermore, the authors state that stock prices act as if

investors cannot predict the lower persistence of less reliable accruals, which leads to significant pricing errors.

Dechow and Dichev (2002) investigated the relation between accruals and earnings quality and its relation, individually, to the estimation error of accruals, verifying if some characteristics of firms can be used as accrual quality instruments. In the paper, a trade-off between performance measurement and reliability is pointed out, because accounting information must be trustworthy and relevant. This trade-off exists because, as information gains confidence, it becomes subjective due to the accuracy of cash flows. Their results indicate that accruals are important for performance measurement and that measurement quality increases as confidence increases. They found a positive relationship between the magnitude of cash flows and the quality of accruals.

Bloomfield, Gerakos and Kovrijnykh (2017) developed work to estimate the rate at which accrual innovations translate into future cash flow, as well as its consequences in using the conversion rate in accrual innovations as an alternative to measure accrual quality. The results of the work indicate that, for firms whose reversal occurs within one year, about 96% of accrual innovations are converted to cash flow in the following year. The authors also point out that accruals are highly correlated with current returns for companies with higher conversion rates. Estimates of conversion rates are highly correlated with AAER issuing than traditional accrual quality measures. The cash conversion measure presented here is not based on the residual variance of accruals and is therefore not contaminated by operating volatility (which represents an advantage over other accrual quality measurement models).

Dechow, Ge and Schrand (2010), conducted a study in which more than 300 articles considered relevant to the literature were evaluated in order to analyze the main profit quality metrics. The main findings of the study show that all proxies for earnings quality are essentially accrual-based earnings figures. These proxies are affected by firm's fundamental performance and the firms' own earnings. Although all these proxies are affected by performance and their measurement, they are not equally affected by these factors. Besides, since proxies focus on different elements of the utility in the decision, they should not be expected to work equally in all circumstances investigated by researchers.

Thus, the third hypothesis of the study is described as:

H3a: Aggregate cash flows presents higher contemporaneous and future association with GDP growth than accounting accruals.

2.3 RESEARCH DESIGN

The research aims to verify if aggregate earnings can forecast future economic activity. Specifically, whether there is a difference between the predictive power of earnings measures. Also, whether the future cash flow component is more persistent in GDP forecast when compared to accruals, both aggregate measures. Since the literature points to lower profit persistence of the components considered more subjective.

To achieve these goals, I use annual data ranging from 2000 to 2017, totaling 18 years in 102 countries where accounting and macroeconomic information intersect. Countries with less than 10 firms per year on average were excluded. Thus, 78 countries remained in the sample, which consists of a maximum of 1440 aggregated observations. The accounting numbers for data aggregation were taken

from the COMPUSTAT GLOBAL platform, while the economic information was extracted from the database of the Penn World table.

2.3.1 Data aggregation

For data analysis, it is necessary to aggregate information about firms' earnings (Net income, operating income and earnings before extraordinary items) over the years. Cash flows and accruals are also aggregate to confirm if there is a difference in the predictive power of these items in relation to GDP growth. All items are weighted by asset size for each company on each date and country. For each country and on each date, the following operations will be performed, where $j = firm, i = country$ and $t = year$.

$$aggregate\ net\ income_{it} = agni_{it} = \sum_{j=1}^{n} \frac{net\ income_{jit}}{total\ assets_{jit}} \quad (1)$$

$$aggregate\ operating\ income_{it} = agoi_{it} = \sum_{j=1}^{n} \frac{operating\ income_{jit}}{total\ assets_{jit}} \quad (2)$$

$$aggregate\ earnings\ before\ extraordinaries\ items_{\ it} = agebei_{it} = \sum_{j=1}^{n} \frac{earnings\ before\ extraordinaries\ items_{jit}}{total\ assets_{jit}} \quad (3)$$

$$aggregate\ operating\ cash\ flow_{it} = agcf_{it} = \sum_{j=1}^{n} \frac{operating\ cash\ flow_{jit}}{total\ assets_{jit}} \quad (4)$$

$$aggregate\ accrual_{it} = agacc_{it} = \sum_{j=1}^{n} \frac{accrual_{jit}}{total\ assets_{jit}} \quad (5)$$

The variablesused to perform aggregations (Net income, operating income, earnings before extraordinary items, cash flow, accruals and assets) are winsorized

at a 1% percent level for each variable in firm level before and after aggregation within each country.

2.3.2 Models

I apply a part of models used by Konchitchki and Patatoukas (2014). The first model is described by equation 6.

$$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \varepsilon_{it+k} \quad (6)$$

Where the dependent variable, g_{it+k}, represents the country's i GDP growth per capita on date $t+k$and the dependent variable, $\Delta agni_{it}$, represents aggregate net income growth for country i on date t relative to date $t-1$. The same model is estimated for k ranging from 0 to 2, which allows to analyze whether present information on aggregate earnings growth is predictive of future GDP growth up to 2 years ahead.

The model described by equation 7 is estimated as follows:

$$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (7)$$

The model differs from the previous one by adding the variable g_{it+k-1}, which represents GDP growth per capita of country i prior to the projected period k and a dummy that separates emerging and non-emerging countries[3], which was created as follows:

$$emerging_{it} = \begin{cases} 1 \; if \; on \; date \; t \; country \; i \; is \; considered \; emerging \\ 0 \; otherwise \end{cases} \quad (8)$$

[3] The selection of emerging countries is made according to a list of the International Monetary Fund - IMF

The purpose of adding lagged growth control is to check whether aggregate earnings convey any additional information to economic activity itself, which could mean that aggregate accounting information has predictive power that is not tied to lagged economic growth.

Solow (1956) reached results that show that countries closer to their own steady states grow at lower rates compared to countries that are further away. The results found by the author can be controlled by the dummy created, as emerging countries are nations that have moved from a stage of underdevelopment or stagnation to a stage of full economic development.

Similarly, the same models will be estimated for the other two aggregate earnings metrics:

$$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \varepsilon_{it+k} \quad (9)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (10)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \varepsilon_{it+k} \quad (11)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (12)$$

Where, $agop_{it}$ and $agpbei_{it}$ represent respectively, growth in operating earnings and in earnings before extraordinary items aggregate metrics. Recalling that the objective of estimate these models using various earnings metrics is to verify that, regardless of profit metrics, the aggregate accounting information predictive capacity continues to exist.

To verify whether the subjectivity of aggregate earnings components interferes differently with GDP growth per capita, both models are estimated:

$$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \varepsilon_{it+k} \quad (13)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (14)$$

Where $\Delta agcf_{it}$ and $\Delta agacc_{it}$represent cash flows and aggregate accruals growth, respectively. A fact that should be highlighted is that a large part of the sample is lost in this estimate due to the lack of information about cash flows and, consequently, accruals, before IFRS adoption in several countries. So, to calculate accruals I use the methodology described by Sloan (1996).

$$accruals = (\Delta CA - \Delta cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep \quad (15)$$

Where:

- ΔCA: Current assets variation
- $\Delta cash$: Cash and cash equivalents variation
- ΔCL: Current liabilities variation
- ΔSTD: Short-term debt variation
- ΔTP: Income tax payable variation
- Dep: Depreciation and amortization expense.

Finally, just as a consolidation of results, rather than just GDP growth, I use in each model above, a dummy variable that captures if, each year, the country is above or below the growth median of the analyzed countries.

$$d\_g_{it+k} = \begin{cases} 1 \; if \; in \; period \; t+k, g_i > median \\ 0 \; otherwise \end{cases} \quad (16)$$

The previously defined models are also estimated using dummy as the model dependent variable, which results in equations 17 to 24.

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \varepsilon_{it+k} \quad (17)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (18)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \varepsilon_{it+k} \quad (19)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (20)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \varepsilon_{it+k} \quad (21)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (22)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \varepsilon_{it+k} \quad (23)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (24)$$

2.3.3 Estimators and tests

The models described by equations 6 to 14 are estimated by ordinary least squares (OLS) controlled by fixed effect of country and year. The error variances are estimated from the White matrix, which is robust to problems of heteroscedasticity and autocorrelation. Models that have a dummy as a dependent variable (from equation 17 to 24) which occurs value 1 when the growth rate is above the median were estimated by a Probit, since the dependent variable is binary.

For the verification of second and third hypothesis, two additional tests are performed:

(i) A Chow test to assess whether there is a statistically significant difference between coefficients of different profit metrics for forecasting GDP growth, particularly operating earnings with other earnings metrics.

(ii) A coefficient comparison test F, made within the models that use cash flows and accruals to predict economic activity, to verify if subjectivity of accrual component reduces its explanatory power over the growth rate.

It is important to note here that the Chow test, which is required for H2 validation, is used because it is a comparison between coefficients from different estimation models. The second test for H3 verification is a comparison of coefficients within the same regression model, this being a simple F-test of coefficient comparison.

Prior to the regression analysis and coefficient comparison tests previously explained, I describe, main variables descriptive statistics, in order to characterize the sample, as well as a correlation analysis in the next section. For the purpose of metrics comparison and its correlations, this analysis is also expanding to groups of countries, dividing the sample into a group of emerging and non-emerging countries.

2.4 RESULTS

The main objective of this paper is to analyze how aggregate accounting metrics convey information about current and future GDP growth. Besides that, I make some comparisons that explain the different predictive powers of these measures. Particularly, I focus on comparing operating income to other profits measures, as well as cash flows to accruals.

Panel A of table 01 presents the descriptive statistics of the main variables studied for the entire sample. It is possible to verify that 78 countries studied grew on average 3.17% over 18 years. However, this metric is extremely volatile, indicating that there is a big difference between the economic growth levels of these countries over time, which is normal considering there are different countries over a long period of time.

When analyzing the aggregate accounting metrics, there is a large dispersion in all of these, especially earnings before extraordinary items. Another important point is that accruals increase have a level of dispersion greater than aggregate cash flows, which may be associated to subjectivity of these accounts.

Panel B in Table 1 shows the mean and standard deviation of emerging and non-emerging countries. Additionally, the result of the two-population mean test is presented comparing the means of the study country variables. My findings show that emerging countries have a statistically higher mean when it comes to per capita GDP growth. This result suggests that on average emerging countries have higher growth rates, which makes sense. According to Solow (1956) theory, countries that are farthest from their own steady state on average grow faster than countries that are closer to their steady state.

The same relation is true when operating earnings and cash flows are analyzed, both metrics are statistically higher for emerging countries. However, net earnings, earnings before extraordinary items and accruals when aggregated are not statistically different between emerging and non-emerging country groups.

These results show evidence confirming my previous hypotheses. Since a higher average GDP growth per capita is accompanied by higher aggregate operating earnings growth and aggregate cash flows growth from emerging countries. Therefore, there are evidence that emerging countries are the ones that have the highest economic growth rates and have the highest operating profit and cash flow growth rates, which indicates that economic growth does not follow changes in net earnings, earnings before extraordinary items, nor firm accruals.

Regarding variables' heterogeneity for different samples, it is possible to verify that GDP growth per capita and aggregate financial metrics are both more volatile on emerging than non-emerging countries groups. This phenomenon may be explained by the number of non-emerging countries are bigger than emerging countries in the sample. For that reason, it is easier to make a considerable distinction between countries. Another possible explanation is that emerging countries are selected for their common characteristics regarding their future growth capacity. Thus, this group of countries tend to be more homogeneous considering its economic activity. So, if accounting data can explain economic activity, these should also be more homogeneous among emerging countries.

TABLE 01: DESCRIPTIVE STATISTICS AND COMPARISON BETWEEN EMERGING AND NON-EMERGING COUNTRIES

Panel A: Descriptive statistics of the complete sample

$Variable$	$Obs.$	$Mean$	$Coef.var.$	$Minimum$	$1st\ quart$	$Median$	$3rd\ quart$	$Maximum$
g_{it}	1437	0.0317	1.093	-0.0846	0.0155	0.0334	0.0524	0.126
$\Delta agni_{it}$	1422	0.230	14.37	-10.61	-0.406	-0.0248	0.405	22.55

$\Delta agoi_{it}$	1432	0.0871	14.02	-5.539	-0.178	0.00911	0.240	6.527
$\Delta agebei_{it}$	1432	0.146	17.95	-9.244	-0.373	-0.0183	0.380	15.86
$\Delta agcf_{it}$	1337	0.492	8.556	-11.63	-0.337	-0.000185	0.436	31.21
$\Delta agacc_{it}$	1344	0.822	11.99	-28.86	-0.661	-0.155	0.489	76.76

Panel B: Descriptive statistics (Emerging *vs* Non-emerging)

	$Non-emerging$			$Emerging$			$m(em) - m(nem)$
$Variable$	$Obs.$	$Mean$	$Std.dev.$	$Obs.$	$Mean$	$Std.dev.$	
g_{it}	1113	0,0396	0,001	324	0,0294	0,002	0,01021***
$\Delta agni_{it}$	1098	0,2050	0,104	324	0.3138	0,1553	-0,1088
$\Delta agop_{it}$	1098	0,2050	0,104	324	0,3137	0,155	0,1087**
$\Delta agpbei_{it}$	1108	0,1584	0,084	324	0,1019	0,099	-0,0565
$\Delta agcf_{it}$	1032	0,2809	0,112	305	1,2062	0,332	0,9253***
$\Delta agacc_{it}$	1038	0,4442	0,253	306	2,1029	0,808	1,6588

Panel A: The table presents some of the main descriptive statistics (Total observations, mean, coefficient of variation, minimum, 1st quartile, median, 3rd quartile and maximum, respectively) of the main variables of the study, which are: g_{it} the GDP growth rate of country $i$on period t, $\Delta agni_{it}$ the aggregate net income growth rate of country $i$on period t, $\Delta agoi_{it}$ the growth rate of aggregate operating income of country $i$on period t, $\Delta agebei_{it}$ the growth rate of earnings before aggregate extraordinary items of country $i$on period t, $\Delta agcfi_{it}$ the growth rate of aggregate cash flows from country $i$on period t according to Sloan (1996). $\Delta agacc_{it}$ and the growth rate of aggregate accruals from country $i$on period t according to Sloan (1996).
Panel B: The same variables in panel A are re-presented, but now the table shows the total observations, means and standard deviations of emerging and non-emerging countries, a mean test is performed comparing the means of the two groups, $m(em) - m(nem)$ represents the difference between emerging and non-emerging group means. Differences marked with an asterisk (*) are statistically significant considering 10% significance. Differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Differences marked with three asterisks (***) are statistically significant with 1%.

Source: Author's own elaboration

Table 02 presents the correlation matrix between variables studied. The results show that growth at current date has a statistically significant and positive correlation with growth rates at previous date and two subsequent years. When it comes to accounting variables, growth at current date has also statistically significant and positive correlation to aggregate cash flow growth, aggregate operating earnings growth and aggregate earnings before extraordinary items. Besides that, there are no correlation with aggregate accruals, which may be linked to its subjectivity.

When it comes to growth from a date ahead, the only aggregate accounting metric growth that does not have a correlation to GDP growth is accruals' account. This result may be associated to greater subjectivity existing in accruals. The

correlations found in other metrics are positive, thus indicating, that all three earnings metrics growth as well as cash flows convey information about GDP growth rate of the countries studied.

The results found for growth of two periods ahead are consistent with the results of one period ahead. Only the variable representing aggregate accruals growth for each country is not significant, but all other correlations are positive, which shows that aggregate accounting metrics convey information about GDP growth from two dates ahead. Moreover, within the correlation of earnings with economic activity, what predominates is the correlation that comes from cash flows. Such results confirm in the foreground the two hypotheses of the chapter.

Figure 1 depicts two point clouds, where on the *x* axis is presented aggregate operating earnings growth rate, while on the *y* axis is GDP growth per capita rate for emerging and non-emerging countries, respectively. In addition, a trend line is drawn from a simple regression model, simply to bring a visual effect to show how aggregate operating earnings convey information about GDP growth rate and whether this relation can change when it comes to an emerging country or not.

The relation between earnings growth rates and GDP growth per capita is on average visually positive for both types of countries, emerging and non-emerging. However, this relation is more evident in emerging countries, indicating that if these results are statistically validated. It may be said that accounting information on operating earnings affects economic activity in emerging countries rather than in other countries.

TABLE 02: CORRELATION ANALYSIS

	g_{it}	g_{it-1}	g_{it+1}	g_{it+2}	$\Delta agni_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$\Delta agoi_{it}$	$\Delta agebei_{it}$	$Emerging$
g_{it}	1									
g_{it-1}	0.5188***	1								
g_{it+1}	0.5010***	0.2843*	1							
g_{it+2}	0.2747***	0.2165*	0.5024***	1						
$\Delta agni_{it}$	0.0380	0.0214	0.0693***	0.0474***	1					
$\Delta agcf_{it}$	0.0276**	0.0160	0.0300**	0.0389*	-0.00600	1				
$\Delta agacc_{it}$	0.00120	-0.0396	0.0164	0.0174	0.0242	0.0973*	1			
$\Delta agoi_{it}$	0.0801*	0.0183	0.0956***	0.1026**	0.0870*	0.00160	0.0158	1		
$\Delta agebei_{it}$	0.0968*	0.0264	0.0417***	0.0291***	0.1938*	0.0192	0.0179	0.0906*	1	
$Emerging$	0.0892***	0.0935*	0.0970***	0.0961***	0.0402	0.0815**	0.0093	0.0786**	0.0659**	1

The values presented represent the correlations between the study variables, which are: g_{it} the GDP growth rate of country i on period t, $\Delta agni_{it}$ the aggregate net income growth rate of country i on period t, $\Delta agoi_{it}$ the growth rate of aggregate operating income of country i on period t, $\Delta agebei_{it}$ the growth rate of aggregate earnings before extraordinary items of country i on period t, $\Delta agcf_{it}$ the growth rate of aggregate cash flows from country i on period $t$according to Sloan (1996). $\Delta agacc_{it}$ the growth rate of aggregate accruals from country i on period t according to Sloan (1996), g_{it-1}, g_{it+1}, g_{it+2} represent GDP growth rates a period ago, a period ahead and two periods ahead respectively for country i and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. Correlations marked with an asterisk (*) are statistically significant with 10% significance, correlations marked with two asterisks (**) are statistically significant with 5% significance, and correlations marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

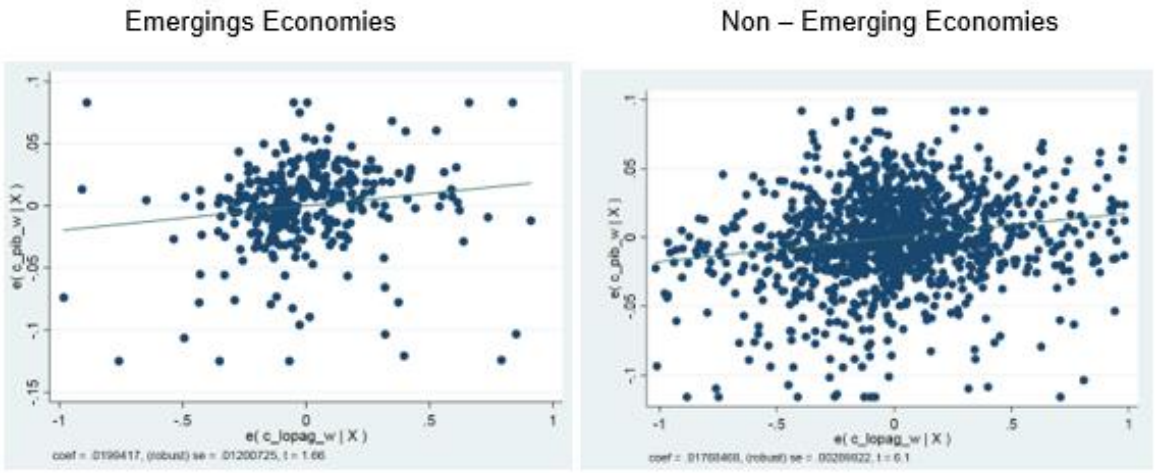

Figure 1: Aggregate operating profit on GDP growth in emerging and non-emerging economies
Source: Author's own elaboration

Table 03 presents the results for the models described by equations 6 and 7, 17 and 18, which uses aggregate net earnings to forecast economic growth in the 78 countries analyzed, either this dependable variable in a continuous way or by the dummy created regarding the median of each year. It is important to stress that model 6 compared to 7 and 17 compared to 18 differ only in terms of the inclusion of GDP growth in previous date and the dummy that separates emerging and non-emerging countries, in order to remove from aggregate accounting information any effect of GDP growth on previous date and characteristics on growth potential to that estimated, capturing only accounting data effect on growth.

In panel A, to current date, aggregate net income growth was not statistically significant to explain GDP growth. However, for both periods ahead this variable is statistically significant in relation to economic activity of each country. This association shows that accounting information measured in this model, a positive relation to the change in GDP over time, although is not linked to growth on accounting information date itself.

This result is supported by equation 7 for one period ahead, i.e., even when earnings are controlled by growth from the date prior to the estimated period and the emerging dummy, higher aggregate net earnings drive to higher future GDP growth rates up to one period ahead. This result is complementary to GDP growth of previous period, since even when control variables are included there are statistical significance of the coefficients and these remained positive. Note that for each 1 percentage point increase in the aggregate accounting variable, the real GDP for the following year grows on average slightly above 0.4 points.

There is a first hint that aggregate net income provides information about countries' future economic activity. Also, countries that have the highest aggregate net income growth have the highest per capita GDP growth in the future.

Regarding the two controls used, only the past growth rate of real GDP is statistically significant in all cases and with positive signs, indicating that, on average, the countries with the highest growth rates in the past date tend to have higher rates growth on the present date.

In relation to panel B, the growth rate of the aggregate accounting data is not relevant to explain future economic activity.

TABLE 03: MODELS WITH AGGREGATE NET EARNINGS AS GROWTH PREDICTOR

Panel A: Using g_{it+k}as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	6	7	6	7	6	7
$\Delta agni_{it}$	0,000049	0,00009	0.00044*	0.00049**	0.00039*	0.00035
	0,20	0,42	1,84	2.25	1.65	1,54
g_{it-1}		0,339***				
		9,02				
g_{it}				0.402***		

				9,31		
g_{it+1}						0,4034***
						8,79
$emerging_{it+k}$		0,015949		0,0108		0,0129
		0,94		0,66		0,74
$constante$	0,0526***	0,01466**	0.0343***	0,0124*	0.0319***	0.0212***
	505.5	1,98	4,88	1,67	3,94	2,72
$Observações$	1422	1351	1345	1345	1344	1268
R^2	0,4245	0,524	0,4366	0,5295	0,4256	0,5495

Panel B: Using d_g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	17	18	17	18	17	18
$\Delta agni_{it}$	-0,00619	0,00417	0,01355	0,01492	0,01521	0,02079
	-0,52	0,32	1,00	1,08	1,21	1.43
g_{it-1}		13,28***				
		8,12				
g_{it}				14,096**		
				8,31		
g_{it+1}						14,24***
						7,98
$emerging_{it+k}$		0,25424		0,35372		0,4272
		0,5		1,08		-0,8
$constante$	1,302***	-0,0925***	-0,1013	-0,8916**	-0,0533	-0,3547
	3,44	-2,42	-0,27	-2,2	-0,14	-0,86
$Observações$	1354	1217	1210	1210	1277	1138
$Pseudo\ R^2$	0,3405	0,3689	0,3247	0,3714	0,3457	0,3996

The table is divided into two panels. Panel A provides estimates for models 6 and 7, while panel B provides estimates for models 17 and 18:
$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \varepsilon_{it+k}$ (6)
$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (7)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \varepsilon_{it+k}$ (17)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (18), where: g_{it} is the GDP growth rate of country i on period t , d_g_{it+k} is a dummy that assumes a value of 1 if the growth rate is above the median and 0 otherwise, $\Delta agni_{it}$ the aggregate net income growth rate of country i on period $t$and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. The models in panel A are estimated by OLS and the models in the second panel by Probit. Columns 1, 3 and 5 show the estimates of the model described by equation 6 in panel A and 17 in panel B at the current date and for the 1 and 2 years' horizons ahead, respectively. Columns 2, 4, and 6 present the estimates for equation 7 in panel A and equation 18 in panel B for the same time horizons as for equation 6. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

Table 04, like previous one, presents results referring to estimates of the models that use earnings before the extraordinary items as aggregate accounting metric to forecast the economic fluctuation.

The results differ from those found for Net earnings growth rates. The growth of earnings before ~~the~~ extraordinary items has an impact on economic activity only on the current date. It is important to emphasize that the sign found for the coefficients is positive, which indicates higher growth rates of real GDP linked to higher growth rates of the studied accounting variable. This result persists regardless of the control of past economic activity and the emerging dummy.

In relation to future dates, it can be said that the metric used in the estimates does not affect the growth rate of real GDP. However, there is a significant effect for two years ahead in the model that has the dummy as a dependent variable. The positive sign found for this coefficient indicates that higher growth of earnings before the extraordinary items signals a greater probability that this country will have a real GDP growth rate above the median.

TABLE 04: MODELS WITH AGGREGATE EARNINGS BEFORE EXTRAORDINARY ITEMS AS GROWTH PREDICTOR

Panel A: Using g_{it+k} as dependent variable

	$k = 0$		$k = 1$		$k = 2$	
$Estimated\ equation$	11	12	11	12	11	12
$\Delta agebei_{it}$	0,0006**	0.0007***	0,00009	-0,000119	-0.00005	-0.00001
	2,05	2,77	0,32	-0,43	-0,16	-0,04
g_{it-1}		0.3441***				
		9,01				
g_{it}				0,409***		
				9,53		
g_{it+1}						0,4111***
						9,12
$emerging_{it+k}$		0,0162		0,0106		0.0126
		0,95		0,65		0,73

$constante$	0,0526***	0.0150**	0.0361***	0,0138*	0.0327***	0.0211***
	7,89	2,02	5,12	1,86	4,05	2,72
$Observações$	1432	1357	1355	1220	1354	1278
R^2	0,4242	0,525	0,4313	0,5276	0,4210	0,5484

Panel B: Using d_g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	21	22	21	22	21	22
$\Delta agebei_{it}$	-0,00506	0,00897	-0,00526	-0,01217	0.0198	0.0302*
	-0,31	0,5	-0,29	-0,65	1,31	1,65
g_{it-1}		13,524***				
		8,28				
g_{it}				14,45***		
				8,56		
g_{it+1}						14,90***
						8,35
$emerging_{it+k}$		0,24012		0,03293		0,39514
		0,639		0,63		0,74
$constante$	1,3173***	-0,9195**	-0.00312	-0,8121**	-0,0602	-0,41198
	3,49	-2,41	-0,01	-2,02	-0,16	-1,00
$Observações$	1364	1223	1220	1220	1287	1148
$Pseudo\ R^2$	0,3408	0,369	0,3208	0.3701	0.3419	0,3975

The table is divided into two panels. Panel A provides estimates for models 11 and 12, while panel B provides estimates for models 21 and 22:
$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \varepsilon_{it+k}$ (11)
$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (12)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \varepsilon_{it+k}$ (21)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (22). where: g_{it} the GDP growth rate of country i on period t , d_g_{it+k} is a dummy that assumes a value of 1 if the growth rate is above the median and 0 otherwise, $\Delta agebei_{it}$ the growth rate of earnings before aggregate extraordinary items of country i on period $t$and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. The models in panel A are estimated by OLS and the models in the second panel by Probit. Columns 1, 3, and 5 show the model estimates described by equation 11 in panel A and 21 in panel B, on the current date and for the horizons of 1 and 2 years ahead, respectively. Columns 2, 4, and 6 present the estimates for equation 12 in panel A and equation 22 in panel B for the same time horizons as for equation 10. Below each coefficient are reported the respective test statistics. Coefficients marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

Table 05, which is divided into two panels, presents results of models that use aggregate operating earnings to forecast GDP growth. The results for the models described in panel A are consistent with the results for aggregate net income and earnings before extraordinary items. Thus, it points out that aggregate operating earnings are statistically significant to explain economic

growth at either period 0, 1 or 2, regardless of whether it is controlled or not by growth of previous period and whether it is emerging or not. Thereby, it continues to show an explanatory power complementarily of accounting data over economic data.

When looking at panel B of the table, the results also indicate that the greater the growth in aggregate net income, the higher the probability of GDP growth falling at a point where this parameter is higher than the median in the year in question. Then, just as aggregate net income, aggregate operating earnings also convey information about growth rate and this effect is complementary to the explanatory power arising from past economic activity itself.

Overall, the three aggregate earnings metrics used are statistically significant to predict the GDP growth per capita rate, whether controlled or not by emerging and lagged growth rates. It shows a validation of the first hypothesis of the study, which states that aggregate earnings convey information about the economic activity.

Below aggregate earnings ratios are reported in addition to test statistics, the differences among coefficients of operating income, net income and operating income to earnings before extraordinary items, respectively. Regardless of the explained variable used, the difference between the operating profit and net income ratios is always positive and statistically significant, indicating that the impact of aggregate operating earnings on present and future growth rates up to two years ahead is higher compared to the impact of net income.

When comparing growth of aggregate operating profits to earnings before extraordinary items, also aggregated, the difference in these coefficients is not statistically significant only in situations where control variables aren't used to predict current growth. Also, when accounting data is used and controls to predict two-year growth ahead and growth dummy for same date is not statically significant. In all other cases, the difference is also statistically significant and positive, indicating that on average, the impact of operating earnings is greater than earnings before extraordinary items.

Thus, the results show the validation of H2, since the impact of a change in aggregate operating earnings is more representative of changes in GDP growth per capita rate of other countries compared to the other two aggregate earnings metrics.

TABLE 05: MODELS WITH AGGREGATE OPERATING EARNINGS AS GROWTH PREDICTOR

Panel A: Using g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	9	10	9	10	9	10
$\Delta agoi_{it}$	0.00156**	0.0017***	0,0205***	0.001805**	0,001899**	0,00128*
	2.240	2.730	2.58	2.27	2,43	1,83
	Coefficient Differences					
$\beta(\Delta agoi_{it}) - \beta(\Delta agni_{it})$	**0.00151****	**0.00161***	**0,02006*****	**0,001315***	**0.00151****	**0.00093****
$\beta(\Delta agoi_{it}) - \beta(\Delta agebei_{it})$	**0.00096**	**0.001***	**0.02041****	**0.001924***	**0.00195***	**0.00129**
g_{it-1}		0,3434***				
		9,02				
g_{it}				0,4069***		
				9,55		
g_{it+1}						0,40569***
						9,03
$emerging_{it+k}$		0,01608		0,01148		0,01334
		0,94		0,73		0,77
$Constant$	0,0527***	0,01487**	0.0355***	0,013384*	0.0322***	0.0209***
	7,88	1,99	5,02	1,79	4,01	2,71
$Observations$	1432	1357	1355	1355	1354	1278
R^2	0,4227	0,5229	0,4357	0,531	0,4249	0,5501

Panel B: Using d_g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	19	20	19	20	19	20
$\Delta agop_{it}$	0.173***	0.228***	0.102**	0.0713**	0.0486	0.0221*
	3.260	3.930	2.020	1.840	0.980	1.930

	Coefficient Differences					
$\beta(\Delta agoi_{it}) - \beta(\Delta agni_{it})$	**0.1792*** **	**0.22383*** **	**0.08845** **	**0.05638* **	**0.03339* **	**0,00131** **
$\beta(\Delta agoi_{it}) - \beta(\Delta agebei_{it})$	**0.17806*** **	**0.21903*** **	**0.10726* **	**0.08347* **	**0.0288** **	**-0.0081**
g_{it-1}		27.79		-		
		11.46				
g_{it}				27.53		
				11.46		
g_{it+1}						27.64
						11.57
$emerging_{it+k}$		0.0064***		0.003***		0.0025***
		6.21		6.45		2.96
$Constant$	-0.0968	-1.061***	0.0249	-0.890***	0.00680	-0.941***
	-0.620	-7.410	0.170	-6.720	0.0500	-7.460
$Observations$	1364	1223	1220	1220	1287	1148
$Pseudo\ R^2$	0,343	0,3721	0.3224	0.3714	0.3416	0,3959

The table is divided into two panels. Panel A provides estimates for models 9 and 10, while panel B provides estimates for models 19 and 20:
$g_{it+k} = \alpha_k + \beta_k \Delta agop_{it} + \varepsilon_{it+k}$ (9)
$g_{it+k} = \alpha_k + \beta_k \Delta agop_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (10)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agop_{it} + \varepsilon_{it+k}$ (19)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agop_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (20). where: g_{it} the GDP growth rate of country i on period$t$, d_g_{it+k} is a dummy that assumes a value of 1 if the growth rate is above the median and 0 otherwise, $\Delta agop_{it}$ the growth rate of aggregate operating income of country i on period$t$and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. The models in panel A are estimated by OLS and the models in the second panel by Probit. Columns 1, 3 and 5 show the model estimates described by equation 9 in panel A and 19 in panel B, on the current date and for the horizons of 1 and 2 years ahead respectively. Columns 2, 4, and 6 present the estimates for equation 10 in panel A and equation 20 in panel B for the same time horizons as equation 8. Below each coefficient test statistics are reported. In the case of aggregate operating earnings, in addition to the test statistic, the difference between the coefficient of operating income and aggregate net income and the difference between the coefficient of operating income and earnings before extraordinary items, respectively, is reported. Coefficients or differences marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients or differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients or differences marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

Table 06 presents the results for models that use cash flows and aggregate accruals to forecast GDP growth. The validation of the third hypothesis of the study is linked to the results found in the estimates of these model.

The results evidenced in panels A and B show that aggregate cash flows have the power to explain both economic growths, as the dummy created about the median in each year. The estimated positive coefficient in all cases indicates that the greater the aggregate flow in an economy, the greater the present and future growth in the next two years in that economy. It can also be said that the higher aggregate cash flow, the greater likelihood that a country is above the median for that specific year.

Note that aggregate accruals are not statistically significant, which means that profit metrics are statistically significant is not tied to this factor. This result can be explained by the subjectivity found in this type of account when analyzed individually company by company.

Overall, it can be said that the third hypothesis of this research is also satisfied when aggregate cash flows prove to be the most relevant part of aggregate profit as a predictor of future economic activity, since the differences between the coefficients are statistically significant and negative. Thus, showing that the impact of cash flows is higher on growth rate when compared to accruals.

It can be said that not only for the US market, but for a set of 78 countries, that different profit metrics are able to explain economic growth, and

especially the part of earnings that conveys information about economic activity is cash flows.

TABLE 06: AGGREGATE ACCRUALS AND CASH FLOW MODELS AS A PREDICTOR OF GROWTH

Panel A: Using g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	13	14	13	14	13	14
$\Delta agcf_{it}$	0.000411**	0.0000651*	0.000195*	0.00018***	0.00012*	0.000046**
	2.2	1.84	1.750	2.720	1.680	2.330
$\Delta agacc_{it}$	0.0000863	0.0000189	-0.0000489	-0.0000351	0.000093	0.0000952
	0.800	0.750	-0.0300	-0.270	0.720	1.040
	Coefficient Difference					
$\beta(\Delta agacc_{it}) - \beta(\Delta agcf_{it})$	**-0.0003247****	**-0.0000462***	**-0.0002439**	**-0.0002151**	**-0.000027****	**-0.0000492**
g_{it-1}	-	0.354***	-	-	-	-
		10.63				
g_{it}	-	-	-	0.354	-	-
				10.59		
g_{it+1}	-	-	-		-	0.352
						10.05
$emerging_{it+k}$	-	0.00852***	-	0.021***	-	0.010***
		6.62		4.52		3.04
$Constant$	0.0322***	0.0204***	0.0330***	0.0216***	0.0329***	0.0213***
	4,35	8,63	8.1	8.78	10.5	8.03
$Observations$	1432	1357	1355	1355	1354	1278
R^2	0,4337	0,545	0,4357	0,534	0,425	0,5555

Panel B: Using d_g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	23	24	23	24	23	24
$\Delta agcf_{it}$	0.0128*	0.0146*	0.0325**	0.0376**	0.0289**	0.0308*
	1.920	1.950	2.210	2.370	2	1.890

$\Delta agacc_{it}$	0.00204	0.00104	-0.00280	-0.00566	0.00574	0.00868
	Coefficient Differences					
$\beta(\Delta agacc_{it}) - \beta(\Delta agcf_{it})$	0.290	0.140	-0.390	-073	0.800	1.060
	-0.01076*	**-0.01356****	**-0.0353**	**-0.03194***	**-0.02316****	**-0.02212*****
g_{it-1}	-	26.67*** 11.03	-	-	-	-
g_{it}	-	-	-	27.52*** 11.25	-	-
g_{it+1}	-	-	-	-	-	27.74*** 11.44
$emerging_{it+k}$	-	0.00657*** 6.7	-	0.0021*** 4.41	-	0.00284*** 2.99
$Constant$	-0.150 -0.940	-1.045*** -7.27	-0.0243 -0.160	-0.922*** -6.890	-0.06 -0.450	-0.988*** -7.860
$Observations$	1364	1223	1220	1220	1287	1148
$Pseudo\ R^2$	0,353	0,3733	0.3244	0.3784	0.3416	0,3961

The table is divided into two panels. Panel A provides estimates for models 13 and 14, while panel B provides estimates for models 23 and 24:
$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \varepsilon_{it+k}$ (13)
$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (14)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \varepsilon_{it+k}$ (23)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (24). where: g_{it} represents the GDP growth rate of country i on period t, d_g_{it+k} is a dummy that assumes a value of 1 if the growth rate is above the median and 0 otherwise, $\Delta agcf_{it}$ the growth rate of aggregate cash flows from country i on period t according to Sloan (1996), $\Delta agacc_{it}$ the growth rate of aggregate accruals from country i on period t according to Sloan (1996) and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. The models in panel A are estimated by OLS and the models in the second panel by Probit. Columns 1, 3 and 5 show the estimates of the model described by equation 13 in panel A and 23 in panel B at the current date and for the 1 and 2 year horizons ahead, respectively. Columns 2, 4, and 6 present the estimates of equation 14 in panel A and equation 24 in panel B for the same time horizons as equation 12. Below the coefficients are reported the respective test statistics for the aggregate accruals variable, in addition to reporting the test statistics, the differences between the accruals coefficient and the cash flow are reported. Coefficients and differences marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients and differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients and differences marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

2.5 CONCLUSION

This paper focuses on verifying if aggregate earnings (on different metrics) are predictive of real GDP growth in a large set of countries over 18 years. In particular, I checked whether there is a difference in the way different earnings metrics convey information about economic activity and whether any aggregate earnings component (cash flow and accruals) convey information on aggregate profits growth rates, believing that earnings are predictive, not due to accruals but to aggregate cash flows, which have a lower level of subjectivity according to the previous research.

As verified by Konchitchki and Patatoukas (2014), aggregate earnings can convey information about the economic activity of each country. Even when using net income, operating income or earnings before extraordinary items this result holds, which shows that results presented by the authors can be extended for countries different to the US, including emerging economies.

The contribution brought by this result is the possibility of expanding economic forecasting models, since the literature points to the non-use of aggregate accounting information as a variable in forecast of future economic activity. The inclusion of these metrics may bring greater predictive capacity to the models.

The results show that aggregate operating incomes have a greater impact on the GDP growth rate of countries studied when compared to other profit metrics, a result that confirms Martanti, Mulyono and Khairurizka (2009), who claim that companies' operating results are what actually price companies.

Regarding the aggregate variables of cash flow and accruals, the main findings are that cash flows and aggregate accruals have different levels of persistence over the forecast of GDP growth. A higher subjectivity of accruals, and the fact that some accruals have no association with the firm's production, makes this component not relevant to explain economic activity of the countries in the study, which leads to the conclusion that it is not really aggregate earnings that convey information about future economic growth, but only part of it aggregate earnings—aggregate cash flows.

The literature points out that components are less persistent in earnings as the subjectivity of these components increases are sustained when this view is expanded to a macroeconomic framework.

The hypotheses raised about profitability and the different levels of predictive power for different earning metrics and their components hold and generate a contribution to the literature regarding aggregate data. Since there is no decomposition of the metric for an exploration of components that can produce improvements in economic forecasting.

In practical contributions, it can be said that when seeking to make a more coherent macroeconomic forecast about economic activity of countries, accounting information should be included in estimates. More specifically, operating income should be used instead of net income and earnings before extraordinary items or cash flows, thus removing the effect of accruals on the estimation results.

3 IFRS ADOPTION AND ACCOUNTING DATA INFORMATIVENESS ON ECONOMIC GROWTH: A CROSS COUNTRY ANALYSIS

3.1 INTRODUCTION

In past two decades, several companies in more than a hundred countries have adopted accounting standards along lines of IFRS. This convergence is associated with the standardization in European Union in 2005 (Gao, Jiang and Zang, 2019; George, Li and Shivakumar, 2016). Since then, a significant number of researchers have been carried out on accounting quality generated by IFRS adoption and most of them point to an increase in accounting information quality (Ashbaugh and Pincus, 2001; Barth et al., 2008; Landsman et al., 2012; Gao, Jiang and Zang, 2019; Ray, 2018, Levitt, 1998; Christensen et al., 2015). Specifically, one of the factors that leads to improved information, according to Christensen et al. (2015) is a reduction of earnings management by discretionary accruals. However, these studies do not discuss how changing reporting quality can affect accounting data informativeness on economic parameters.

The informativeness of aggregate accounting data for forecasting economic parameters has become an increasingly frequent discussion in the literature. Konchitchki and Patatoukas (2014) clarify that American economy data, in regard to economic activity, are consistently linked to aggregate earnings of country's firms, while Gallo et. al (2016) show that the same aggregate accounting measure is associated with the monetary policies

decisions of a country. The authors also show that not including accounting data in economic forecasting models increases forecasting errors.

The study objective is to verify if adopting IFRS around the world changes aggregate accounting data informativeness on economic growth forecast. In addition, I analyze whether the difference in informativeness of aggregate accruals and cash flows on GDP growth changes with IFRS adoption. The hypothesis is that an improvement in accounting information, caused by adoption of IFRS, increases the coefficient that measures aggregate earnings informativeness on economic activity, and cash flow and accruals coefficients are less different for the same reason.

Some authors like Ball (2006) and George, Li and Shivakumar (2016) argue that the possibility of accounting comparison among countries in a single accounting pattern is the most relevant motivation for an international standardized rule. George, Li and Shivakumar (2016) state that even if IFRS does not improve accounting information, adopting international rules promotes international trade by reducing differences among financial reports.

The research contributes to literature that deals with the informativeness of aggregate data and to literature which is associated to effect of IFRS adoptions around the world. Analyzing the incremental effect that standardization of accounting reports generates in forecast of economic growth can reestablish how economic forecasts are done, and how convergence towards international accounting models is seemed.

I use three earnings metrics to investigate my hypothesis: Net income, operating income, and earnings before extraordinary items. In order to achieve the objectives described, my models are estimated considering real GDP

growth per capita up to two periods ahead as the dependent variable. Thus, the independent variable reflects present aggregate data growth (for each aggregate earnings metrics mentioned above or cash flows and aggregate accruals). Moreover, I add a dummy variable that captures whether a country has adopted IFRS and, also, the product between IFRS dummy and each aggregate accounting variable. Both variables are added in order to ascertain whether the adoption of IFRS enhances the relation previously found between aggregate data and real GDP growth rate per capita.

My results show that adopting IFRS in countries increases coefficient that measures the effect of aggregate earnings on future GDP growth. Additionally, the difference between cash flows and accruals coefficients is less evident after standardized international rules. These results may be linked to improved information.

The informativeness of aggregate accounting data on GDP growth forecasts increased after IFRS adoption, evidencing that accounting information contributes to improving economic activity prediction and can serve as redirector of forecasting mechanisms. Furthermore, the fact of IFRS adoption influences predictive power contributes to dividing countries in two groups. One is formed by countries where IFRS were adopted and in which have highly informative accounting data on economic growth. The other group is formed by countries that have not adhered to international standards, and their financial statements are not as informative about economic activity as those of the first group.

This study is divided into 4 more sections. Initially, prior literature and hypotheses development seeks to make a general overview on previous

literature, mainly addressing the effect of IFRS adoptions on accounting information quality. In research design, it is presented which models and statistical treatments data are submitted in order to achieve research objectives. A results section shows the model estimates and a topic for conclusions.

3.2 PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT

3.2.1 Economic activity and aggregate earnings

Konchitchki and Patatoukas (2014) say that GDP is the main and most important metric for measuring economic activity. Further, mentioning that a good forecast of this metric is fundamental for public budgets preparation, and for decisions regarding monetary policies. For Henderson et. al (2012), GDP is the most important variable when it comes to measuring economic growth.

Konchitchki and Patatoukas (2014) find that aggregate earnings growth rate transmits information about future real GDP growth and show that this effect is incremental to that explained by country's economic activity. This result can be justified by Fischer and Merton (1984), who state that corporate profits are an important GDP component and can still be associated to other elements of the product.

In addition to conveying information about GDP growth rate, aggregate earnings transmit information about interest rates adopted by monetary authorities in the North American market, according to Gallo et. al (2016). This fact was discovered by the authors when analyzing the negative relation between earnings and aggregate returns found by Kothari et al. (2006) as well as Cready and Gurun (2009).

3.2.2 The adoption of IFRS and accounting quality information

In 2005, European Union countries standardized accounting reports to IFRS. This obligation is linked to a law that was introduced in 2002. According

to Gao, Jiang and Zang (2019) and George, Li, & Shivakumar, L. (2016) this event also led a very large number of companies in more than 100 nations to also adhere to international standards, or at least to closely link their local standards to IFRS. Hong Kong and Australia immediately followed the European Union and several other countries followed along. The authors remark that the accounting convergence is the most significant in history. George, Li & Shivakumar, (2016) claim that even though 2005 proved to be a major milestone in transitions around the world, the costs and benefits were not yet clear.

In regulation for IFRS adoption on European Union generated in 2002, two main objectives are set for this. First is to improve accounting information quality, second is to improve comparability of various statements. Cox (2014) points to an unlikely adoption by the United States, which for the authors is a consequence of uncertainty regarding long-term benefit of these adoptions.

A commonly discussed point over regime change is the alteration in accounting information quality. Some findings, in previous literature, identified that, on average, IFRS adoption has increased accounting quality (Ashbaugh and Pincus, 2001; Barth et al., 2008; Landsman et al., 2012; Gao, Jiang and Zang, 2019; Ray, 2018, Levitt, 1998; Christensen et al., 2015).

Levitt (1998), as well George, Li and Shivakumar (2016) believe that reports elaborated under IFRS standard have higher quality than previous local GAAP. They also state that the adoption generates an improvement in financial transparency and leads to a reduction of asymmetry in capital market, as well as reducing cost of capital, generating comparability and attracting foreign investors. Ray (2018) affirms that uniformed standards, brought by the

adoption, decrease the costs of access to capital market by investors, and increase capital offer. However, there is an increase in standardization cost for companies. According to Ball (2006), adopting IFRS generates some improvements in accounting data, such as providing more informative metrics and reducing manipulation of accounting information.

Christensen et al. (2015) conducted research in Germany during a non-mandatory IFRS period. They studied two groups, one of companies that use IFRS voluntarily and other that does not. It is evident that companies that adopted IFRS have significantly less earnings management and greater relevance to book value. Ashbaugh and Pincus (2001) point to improving disclosures and analysts' forecasts quality after IFRS adoption. Landsman, Maydew and Thornock (2012) evidenced that adopting standards increases accounting information content as well as investment.

According to Landsman et al. (2012), in countries that adopted IFRS, there was an increase on information content existing in accounting earnings compared to countries that did not undergo changes in their accounting regimes. At the time of the research, Brazil was among countries that had not adhered to changes in accounting standards. In their studies, Karampinis and Hevas (2009) showed that, when analyzing the consolidated balance sheet, adopting the new accounting model positively affects earnings and equity. Furthermore, Ahmed, Chalmers and Khlif (2013) found that there is a positive shock in earnings and stock price relation after IFRS implementation.

The comparability of accounting records is an explanation by Ramanna and Sletten (2014) for a fast convergence of countries to IFRS model after 2005. The authors explain that transaction costs between countries are reduced

as a single accounting system is adopted. Kim and Verrecchia (1194, 1997) claim that processing financial reports is expensive and part of the cost is learning about accounting standards. Gao, Jiang and Zang (2019) claim that adopting the same accounting standards in many countries increases the comparability of reports and reduces costs.

Gao, Jiang and Zang (2019), in their theoretical paper, show that the effect of adopting IFRS is ambiguous on company value and liquidity. It can lead to greater value and greater liquidity, even if the adoption reduces accounting reports quality, as a result of positive externality of adopting the standards. The authors, in their models, consider two effects to measure adopting standards gain, precision effect and network effect. Precision effect is related to a change in accuracy level of information coming from the adoption. Network effect is about the opportunity to use standardized information with other countries and to reduce costs of generating financial reports. The two effects combined to verify the effect of full IFRS adoption.

The improvement that Gao, Jiang and Zang (2019) found is not related to reports accuracy, but in the network effect. The authors show that IFRS adoption improves the firm's liquidity and value, but this is not necessarily due to superiority of IFRS. This result is consistent with a reduction in reports quality, with an increase in value and improving liquidity. (for example, Ahmed et al., 2013; Barth et al., 2008; De George et al., 2016).

Despite studies that point out the relevance of adopting IFRS, there are uncertainties about its real impact. For George, Li and Shivakumar (2016) the development of high quality accounting standards may not automatically convert into companies that provide high quality financial reports. Fiechter and

Novotny-Farkas (2015), as well as Soderstrom and Sun (2007) and Niyama (2007) argue that the cost and benefit of requiring an accounting standard may differ depending on the country, since there are legal and cultural factors and institutional differences between nations.

There are also researchers who question the use of a single standard. These authors point to benefits arising from allowing both IFRS and US GAAP to be adopted, which can encourage innovations in accounting reports from the effects of competition (Dye and Sunder, 2001; Sunder, 2011).

Thus, two research hypotheses are raised in the chapter:

H1b: IFRS adoption increases aggregate earnings informativeness of economic activity.

H2b: The difference between earnings components informativeness in economic activity is smaller after IFRS adoption.

3.3 RESEARCH DESIGN

The research aims to verify if adopting IFRS in various countries around the world improves aggregate earnings predictive capacity in relation to economic activity, since the literature indicates an improvement in accounting information after standards internationalization.

To achieve these objectives, annual data ranging from 2000 to 2017 are used. Thus, the sample covers 18 years of data in 102 countries. The sample only considers countries that have accounting information for at least 10 firms per year, on average. Thus, 78 countries remained in the sample, which consists of a maximum of 1440 aggregated observations. The accounting data used in aggregation as well as information regarding IFRS adoption (or non-adoption) date were extracted from COMPUSTAT GLOBAL platform, while economic information was taken from the Penn World Table database. It is important to note that the accounting information was extracted by company, to then go through the aggregation process, which will generate data for the countries throughout the sample period.

3.3.1 Data aggregation

For the data analysis, it is necessary to aggregate earnings metrics of firms (Net income, operating income and earnings before extraordinary items) over the years, as well as cash flows and accruals. For each country on each date, the same operations presented in previous chapter are performed, where $j = firm, i = country\ and\ t = year$. Thus, all items are weighted by each company's asset size on a date in a country.

$$aggregate\ net\ income_{it} = agni_{it} = \sum_{j=1}^{n} \frac{net\ income_{jit}}{total\ assets_{jit}} \quad (1)$$

$$aggregate\ operating\ income_{it} = agoi_{it} = \sum_{j=1}^{n} \frac{operating\ income_{jit}}{total\ assets_{jit}} \quad (2)$$

$$aggregate\ earnings\ before\ extraordinaries\ items\ _{it} = agebei_{it} = \sum_{j=1}^{n} \frac{earnings\ before\ extraordinaries\ items_{jit}}{total\ assets_{jit}} \quad (3)$$

$$aggregate\ operating\ cash\ flow_{it} = agcf_{it} = \sum_{j=1}^{n} \frac{operating\ cash\ flow_{jit}}{total\ assets_{jit}} \quad (4)$$

$$aggregate\ accrual_{it} = agacc_{it} = \sum_{j=1}^{n} \frac{accrual_{jit}}{total\ assets_{jit}} \quad (5)$$

The variables used to perform aggregations are winsorized at a 1% percent level for each variable in firm level before and after aggregation within each country.

3.3.2 Models

The first model estimated is described by equation 28.

$$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (28)$$

Where the dependent variable, g_{it+k}, represents GDP growth per capita of country i on date $t + k$ and the dependent variable, $\Delta agni_{it}$, represents aggregate net income growth of country i on the date t regarding date $t - 1$ and IFRS variable represents a dummy that assumes 1 if on a date the country is under IFRS and 0 otherwise. The same model is estimated for *k* ranging between 0 and 2, which allows to analyze if the present information of aggregate earnings is predictive of the future GDP growth even in 2 years

ahead. The coefficient of the product of aggregate earnings growth rate and IFRS dummy seeks to measure whether there is a difference in the effect of aggregate net earnings on GDP growth per capita depending on whether a country has adopted IFRS or not.

After that, the model described by equation 29 is estimated:

$$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (29)$$

The model differs from the one previously presented by adding the variable g_{it+k-1}, representing GDP growth per capita of country i on the date before projected period, k, and the emerging variable[4].

The purpose of adding these controls is to verify whether aggregate earnings transmit any additional information to the economic activity itself. Moreover, the fact that a country has some growth potential, measured by the dummy, would mean that aggregate accounting information has predictive power that is not tied to lagged economic growth or the fact that s country is emerging.

Similarly, the same models are estimated for the two other aggregate earnings metrics:

$$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (30)$$

[4] The selection of emerging countries is made according to a list of International Monetary Fund – IMF and the variable is created as $emerging_{it} = \begin{cases} 1 \; if \; on \; date \; t \; country \; i \; is \; considered \; emerging \\ 0 \; otherwise \end{cases}$ (8)

$$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (31)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (32)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (33)$$

Where, $\Delta agoi_{it}$ and $\Delta agebei_{it}$ represent, respectively, growth of aggregate metrics of operating income and earnings before extraordinary items. The motivation of re-estimating using these earnings metrics is to verify whether aggregate accounting information predictive capacity continues to exist and whether this is enhanced by the adoption of IFRS, regardless of earnings metrics.

Finally, aggregate earnings are divided between aggregate cash flows and accruals.

$$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (34)$$

$$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (35)$$

Where $\Delta agcf_{it}$ and $\Delta agacc_{it}$represent the growth of aggregate cash flows and aggregate accruals, respectively. Again, considering the possibility of sample reduction due to information loss because the lack of cash flows data

before IFRS adoption, the methodology described by Sloan (1996) is used to calculate accruals[5].

Finally, just as a consolidation of results, instead of using only GDP growth, it is used in each model mentioned above, a dummy variable that captures whether each year, the country is above or below the median growth of the set of countries analyzed[6].

The models previously defined is also estimated using a dummy as the dependent variable of the models, which results in equations 36 to 43.

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (36)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (37)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (38)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (39)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (40)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (41)$$

[5] $accruals = (\Delta CA - \Delta cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep$ (15)

ΔCA: Current assets variation, $\Delta cash$: Cash and cash equivalents variation, ΔCL: Current liabilities variation, ΔSTD: Short-term debt variation, ΔTP: Income tax payable variation, Dep: Depreciation and amortization expense.

[6] The variable is created as equation 16. $d\_g_{it+k} = \begin{cases} 1 \; if \; in \; period \; t+k, g_i > median \\ 0 \; otherwise \end{cases}$ (16)

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \varepsilon_{it+k} \quad (42)$$

$$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k} \quad (43)$$

The models that use g_{it+k} as dependent variable are estimated by OLS controlled by fixed effect of country and year and the error variances are estimated from the White matrix, which is robust to problems of heteroscedasticity and autocorrelation, while models that have a dummy as a dependent variable (of equation 36 to 43) are estimated by a Probit. Since the dependent variable is binary, it assumes 1 when the growth rate is above the median and 0 otherwise.

To verify the second hypothesis, two analyzes are necessary. One concerning the effect of adopting IFRS on the relation between each aggregate component and GDP growth (which can be captured by the product coefficient between an IFRS dummy and each aggregate component). The other analysis deals with the comparison of these coefficients in order to verify if the impact of accounting standardization causes in the relation between aggregate data and economic activity is different between the components. The first analysis can be verified simply by analyzing whether the studied coefficient is statistically significant as well as its sign. However, the second analysis depends on the comparison of two coefficients within the same model, which is made from an F test.

3.4 RESULTS

In countries that have adopted IFRS, the relation between aggregate accounting information and economic data is supposedly stronger than non IRFS adoption. This result is expected by some factors as previous literature indicates that accounting earnings, when aggregated, can improve GDP growth rate forecast. This relation is also explained by accounting information undergoes an improvement and becomes more adequate due to the standardization of the standard.

Table 07 shows the descriptive statistics of studied countries over 18 years of the sample. The table was divided into two panels. Panel A exhibits countries' statistics after adopting IFRS, while panel B reveals countries' statistics before the adoption or even if have not adopted. In addition, the difference between means of the two groups variables is presented and a hypothesis test is performed for its difference.

It is possible to verify the average growth rate of the sample among countries that adopted IFRS is higher than the average rate of countries that did not adopt. Despite that, this difference is not statistically significant indicating that economic activity does not behave distinctively for these different countries or at different times.

Among aggregate accounting metrics, net income, operating income and accruals are statistically different between the group of countries which adopted IFRS and the ones that have not. The difference is positive, which shows that on average after IFRS adoption these earnings metrics are higher.

All variables, both aggregate accounting and economic growth are more dispersed in panel B, that corresponds to countries before IFRS adoption. This result points out that following international standards around the world makes data more homogeneous, which is consistent for accounting variables, since countries are converging to a single system.

TABLE 07: DESCRIPTIVE STATISTICS OF COUNTRIES THAT HAVE ADOPTED AND HAVE NOT ADOPTED IFRS

Panel A: Descriptive statistics for countries after adopting IFRS

$Variable$	$Obs.$	$Mean$	CV	$Minimum$	$1st\ quart$	$Median$	$3rd\ quart$	$Maximum$	$m(ifrs) - m(nifrs)$
g_{it}	567	0.0396	0.803	-0.0846	0.0226	0.0412	0.0592	0.126	0,0136
$\Delta agni_{it}$	554	0.261	13.01	-10.61	-0.365	-0.0119	0.446	22.55	0.053*
$\Delta agpi_{it}$	564	0.188	6.964	-5.539	-0.135	0.0199	0.235	6.527	0.171**
$\Delta agebei_{it}$	564	0.246	10.20	-9.244	-0.333	0.00680	0.443	15.86	0.1683
$\Delta agcf_{it}$	484	0.703	7.299	-11.63	-0.335	0.0637	0.634	31.21	0.402
$\Delta agacc_{it}$	490	1.566	7.755	-28.86	-0.757	-0.144	0.820	76.76	1.1276*

Panel B: Descriptive statistics for countries before adopting IFRS or that have not adopted

$Variable$	$Obs.$	$Mean$	CV	$Minimum$	$1st\ quart$	$Median$	$3rd\ quart$	$Maximum$
g_{it}	852	0.0260	1.371	-0.0846	0.0113	0.0262	0.0449	0.126
$\Delta agni_{it}$	851	0.208	15.76	-10.61	-0.442	-0.0393	0.400	22.55
$\Delta agpi_{it}$	851	0.0174	67.06	-5.539	-0.234	-0.00914	0.237	6.527
$\Delta agebei_{it}$	851	0.0777	34.82	-9.244	-0.434	-0.0507	0.341	15.86
$\Delta agcf_{it}$	838	0.381	9.460	-11.63	-0.337	-0.0343	0.350	31.21
$\Delta agacc_{it}$	838	0.429	19.31	-28.86	-0.579	-0.154	0.395	76.76

The table is divided into two panels to represent descriptive statistics. In the first panel (A) are the descriptive statistics of the study variables for countries after the adoption of IFRS, in addition to the results of comparison tests of means between countries before (or that did not adhere) and after adoption. The second panel (B) shows the statistics of the countries before converging to IFRS or that have not adopted, where: g_{it} represents the GDP growth rate of country i on date t,$\Delta agni_{it}$, the growth rate of aggregate net income of country i on date t, $\Delta agoi_{it}$ the growth rate of aggregate operating income household in country i on date t, $\Delta agebei_{it}$ the growth rate of aggregate earnings before extraordinary items in country i on date t, $\Delta agcf_{it}$a growth rate of aggregate cash flows of country i on date t according to Sloan (1996) and $\Delta agacc_{it}$ the growth rate of aggregate accruals of country i on date t according to Sloan (1996). In the means comparison test $m(ifrs)$ indicates the mean of the variable after the adoption of IFRS for the countries that adopted the standard, whereas $m(nifrs)$ represents the mean for the other group (before adopting or not adopting). Differences marked with an asterisk (*) are statistically significant considering 10% of significance. Differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Differences marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

Figure 02 shows in two point clouds the relation between aggregate operating income (metric that has the greatest influence on real GDP growth rate following second chapter) and GDP growth rate from a date ahead. On the left side, I show the relation for countries after IFRS adoption, while on the right, the relation for countries before adopting. It is notable that the relation is positive in either of the two scenarios, as expected and already shown, indicating that aggregate operating income are informative about next year's GDP growth rate.

When comparing the two trend lines created for each point cloud, based on simple regressions, it is noticeable that there is a slight difference in inclinations between the two groups of data. The inclination of countries after adopting IFRS is greater than that of countries before adopting, which evidences the effect of aggregate operating income is greater on growth rate when occurs the internationalization of standards in studied countries. This result corroborates the validation of my first hypothesis about IFRS ability to improve aggregate data predictive power

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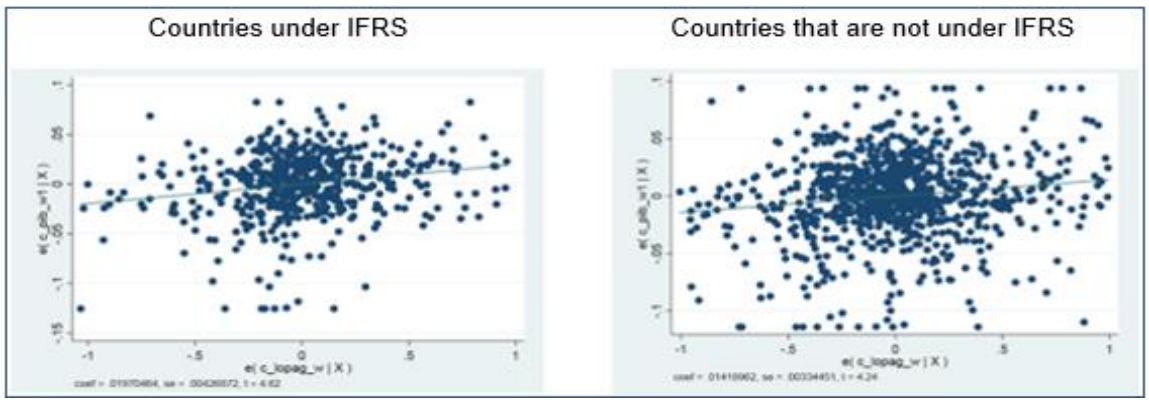

Figure 2: Growth in aggregate operating earnings vs economic growth for a period ahead for countries that have adopted and have not adopted IFRS
Source: Author's own elaboration

Table 08 shows models estimations that use aggregate net earnings as a predictor of real GDP growth rate. The main objective is to analyze the inclination dummy formed by the product between IFRS dummy and aggregate data. This variable is significant for GDP forecast of one and two years ahead, showing a positive sign in coefficients for both cases, which shows that adopting IFRS tends to increase aggregate variable's coefficient. As a result, aggregate net income convey information concerning countries' economic activity and the impact size of aggregate data on GDP growth rate is even greater when those countries adopt IFRS.

This result is verifiable in both situations, in which the model is controlled by the growth rate of the past date and by the emerging dummy, as in not controlled model. Thus, the effects of aggregate data and IFRS in this model are not mixed to the impact of past data and the fact of being emergent or not.

The results are consistent when the dependent variable is a dummy that separates countries which are above or below the median growth rate on each date. Moreover, the higher aggregate net income the greater likelihood that a country is above the median growth rate. Also, if countries have converged to IFRS model the greater expansion in the probability arising from the increase in aggregate net income.

These results are strong indications to confirm my first hypothesis, since it is evident that aggregate net income, as already shown, have a positive effect on growth rates and is even greater when countries converge to IFRS.

TABLE 08: MODELS WITH AGGREGATE NET INCOME AND IFRS AS PREDICTORS OF GROWTH

Panel A: Using g_{it+k} as a dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	28	29	28	29	28	29
$\Delta agni_{it}$	0.00012	0.00017	0.0005**	0.00047**	0.00031*	0.00012**
	0.840	0.930	2.480	2.220	1.82	2.04
$IFRS_{it}$	0.013	0.0082	0.0091	0.0036	0.0015	0.0023
	1.12	0.89	0.23	0.91	0.29	0.73
$\Delta agni_{it} * IFRS_{it}$	0.0004	0.0002	0.00012*	0.00025**	0.0004**	0.00014***
	1,33	1,29	1.88	2.09	2.17	3.44
g_{it-1}		0.335***				
		9.44				
g_{it}				0.353***		
				5.56		
g_{it+1}						0.255***
						3.95
$emerging_{it+k}$		0.00774***		0.0112*		0.0088**
		3.47		1.79		1.98
$constant$	0.0354***	0.0201***	0.0342	0.0208***	0.0332***	0.0219***
	44.12	16.16	1.52	22.89	10.78	6.44
$observations$	1422	1351	1345	1345	1344	1268
R^2	0,4785	0,5944	0,4466	0,5595	0,4556	0,5095

Panel B: Using d_g_{it+k} as dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	36	37	36	37	36	37
$\Delta agni_{it}$	0.0074	0.0092	0.0224*	0.0224**	0.0141**	0.00230*
	0.62	1.29	1.86	2.19	1.99	1.95

$IFRS_{it}$	0.022	0.0358	0.011	0.053	-0.042	0.0019
	1.44	0.89	1.01	0.44	0.59	0.97
$\Delta agni_{it} * IFRS_{it}$	0.0012	0.0023	0.0092**	0.0074*	0.0011*	0.0044
	1.23	1.42	2.04	1.77	1.71	1.59
g_{it-1}		0.0091***				
		10.11				
g_{it}				0.019**		
				2.01		
g_{it+1}						0.022**
						1.98
$emerging_{it+k}$		0.00441***		0.00195***		0.00272***
		6.66		4.17		3.98
$constant$	0.0015	0.005***	0.0442	0.0077***	0.00297*	0.945***
	1.13	6.920	0.290	7.98	2.17	6.67
$observations$	1354	1217	1210	1210	1277	1138
$Pseudo\ R^2$	0,3705	0,4089	0,3857	0,3564	0,3777	0,3746

The table is divided into two panels. Panel A provides estimates for models 28 and 29, while panel B provides estimates for models 36 and 37:
$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \varepsilon_{it+k}$ (28)
$g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \alpha emerging_{it} + \varepsilon_{it+k}$ (29)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \varepsilon_{it+k}$ (36)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agni_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agni_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \alpha emerging_{it} + \varepsilon_{it+k}$ (37), Where: g_{it+k}represents the GDP growth rate of country i on date $t+k$, d_g_{it+k} represents the dummy that takes value 1 if on the date $t+k$ country i is above the median real GDP growth rate per capita, $\Delta llag_{it}$the growth rate of aggregate net income in country i on date t, IFRS a dummy variable that takes value 1 if the country has adopted IFRS and 0 otherwise and the emerging variable is a dummy that takes value 1 if the country is considered emerging and 0 otherwise. Columns 1, 3 and 5 present the estimates of the model described by equation 28 in panel A and 36 in panel B, at the current date and for the horizons of 1 and 2 years ahead, respectively. Columns 2, 4 and 6 show the estimates of equation 29 in panel A and equation 37 in panel B for the same time horizons cited for equation 28. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% of significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

Table 09 shows estimated results when aggregate accounting metric is growth of earnings before extraordinary items. In general, the results are very similar to those found for growth of aggregate net income, except if earnings are correlated with GDP growth rate at current date. For date 2, the coefficients of aggregate metric are significant except when it comes to the model without controls of emerging countries and past economic activity.

The positive signs found in growth of aggregate accounting metric coefficient only reinforces the result mentioned in previous chapter, that accounting data explains future economic activity.

The inclination dummy coefficient proved to be statistically significant and positive for one period ahead and for two periods ahead when models were not controlled by growth rate on previous date and by the dummy of emerging countries. This result indicates that, on average, IFRS adoption makes the coefficient of aggregate earnings before extraordinary items higher, which means that this variable has a greater impact on future economic activity in economies that have already converged to IFRS models.

The findings again corroborate H1b validation formulated in this chapter, since IFRS adoption makes information about net earnings and earnings before extraordinary items even more predictive about future economic growth.

TABLE 09: MODELS WITH AGGREGATE EARNINGS BEFORE EXTRAORDINARY ITEMS AND IFRS AS PREDICTORS OF GROWTH

Panel A: Using g_{it+k} as a dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	32	33	32	33	32	33
$\Delta agebei_{it}$	0.00092***	0.0011***	0.00034***	0.000132*	0.0001	0.00032*
	3.36	3.370	2.89	1.84	0.99	1.86
$IFRS_{it}$	0.0256	0.0658	0.0025	0.0052	0.325	0.058
	0.66	0.89	0.21	1.44	0.78	1.52
$\Delta agebei_{it} * IFRS_{it}$	0.0012	0.0023*	0.0012*	0.00095**	0.00084***	0.0014**
	1.48	1.74	1.85	2.09	3.44	1.98
g_{it-1}		0.344***				
		13.13				
g_{it}				0.344***		
				4.48		
g_{it+1}				-		0.0918*
						6.52
$emerging_{it+k}$		0.00782***		0.0391***		0.0488***
		5.5		6.78		4.48
$constant$	0.0424	0.0265***	0.0323***	0.0289***	0.047***	0.0298***
	0.89	19.06	13.65	4.94	10.9	18.69
$observations$	1432	1357	1355	1220	1354	1278
R^2	0,4242	0,555	0,4453	0,485	0,4351	0,554

Panel B: Using d_g_{it+k} as a dependent variable

	$k=0$		$k=1$		$k=2$	
Estimated equation	40	41	40	41	40	41
$\Delta agebei_{it}$	0.031*	0.0560**	0.0282**	0.00653*	0.0025	0.0255**
	1.77	2.24	2.14	1.69	1.19	2.22

$IFRS_{it}$	0.001	0.0025	0.0085	0.0023	0.025	0.047
	0.65	2	0.65	1.25	0.98	1.11
$\Delta agebei_{it} * IFRS_{it}$	0.0011*	0.0019	0.0094**	0.0095***	0.0021	0.0044*
	1.85	1.42	2.18	4.49	1.52	1.90
g_{it-1}		0.0256***				
		10.10				
g_{it}				0.0236		
				9.98		
g_{it+1}						0.0054
						5.58
$emerging_{it+k}$		0.0056***		0.0033***		0.00285***
		3.56		9.94		7.78
$constant$	-0.0844*	-0.0894***	0.0317	0.001	0.0856	0.025**
	-1.82	-8.51	0.23	1.22	0.045	2.14
$observations$	1364	1223	1220	1220	1287	1148
$Pseudo\ R^2$	0,3778	0,401	0,3233	0.3774	0.354	0,4015

The table is divided into two panels. Panel A provides estimates for models 32 and 33, while panel B provides estimates for models 40 and 41:
$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \varepsilon_{it+k}$ (32)
$g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (33)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \varepsilon_{it+k}$ (40)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agebei_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agebei_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (41). Where: g_{it+k}represents the GDP growth rate of country i on date $t+k$, d_g_{it+k} represents the dummy that takes value 1 if on date $t+k$ country i is above the median real GDP growth rate per capita, $\Delta agebei_{it}$the rate of growth aggregate earnings before the extraordinary items of country i on date t, IFRS a dummy variable that takes value 1 if the country has adopted IFRS and 0 otherwise and the emerging variable is a dummy that tales value 1 if the country is considered emerging and 0 otherwise. Columns 1, 3 and 5 show the estimates of the model described by equation 32 in panel A and 40 in panel B, on the current date and for the 1 and 2 year horizons ahead, respectively. Columns 2, 4 and 6 show the estimates of equation 33 in panel A and equation 41 in panel B for the same time horizons cited for equation 32. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% of significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

The results for growth of operating income are consistent with findings for other aggregate earnings metrics. As a result, operating income also convey information about economic activity. Regarding the inclination dummy, in panel A, there is no statistical significance only for growth rate of current date. For the two other estimated dates the coefficients are significant and positive, regardless of controlling or not by the growth of past date and emerging economies dummy.

The results are similar when the dependent variable is median dummy. It can be said that after IFRS adoption, operating profits become more informative in relation to future growth rate of GDP per capita.

The significance found for inclination dummies (for all aggregate earnings metrics) leads to the assertion of hypothesis H1b. It can be said that aggregate earnings are not only informative about economy future movement, but also that this relation is even greater for countries that have changed to international standards.

TABLE 10: MODELS WITH AGGREGATE OPERATING INCOME AND IFRS AS PREDICTORS OF GROWTH

Panel A: Using g_{it+k}as a dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	30	31	30	31	30	31
$\Delta agoi_{it}$	0.00146	0.00274***	0.00194**	0.00142*	0.00208***	0.00152*
	1.12	3.35	2.44	1.94	2.590	1.72
$IFRS_{it}$	0.011	0.0092	0.0062	0.0014	0.0019	0.0006
	1.12	0.28	1.02	1.21	0.36	0.19
$\Delta agoi_{it} * IFRS_{it}$	0.0004	0.0002	0.00012*	0.00025**	0.0004**	0.00014***
	1,33	1,29	1.88	2.09	2.17	3.44
g_{it-1}		0.0158***				
		5.54				
g_{it}				0.025**		
				2.21		
g_{it+1}						0.0441***
						3.98
$emerging_{it+k}$		0.0077***		0.012***		0.0091***
		7.91		4.52		4.41
$constant$	-0.0323***	-0.0204***	-0.0452***	0.00015**	-0.0021***	0.0048**
	-7.58	-12.54	-9.58	2.25	-8.84	2.22
$observations$	1432	1357	1355	1355	1354	1278
R^2	0,4457	0,5499	0,4485	0,5341	0,4245	0,5551

Panel B: Using d_g_{it+k} as a dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	38	39	38	39	38	39
$\Delta agoi_{it}$	0.173***	0.228***	0.102**	0.0713**	0.0486	0.0221*
	3.260	3.930	2.020	1.840	0.980	1.930

$IFRS_{it}$	0.034*	0.0358	0.011	0.053	-0.042	0.0019
	1.77	0.052	1.22	0.29	0.065	0.94
$\Delta agoi_{it} * IFRS_{it}$	0.0015	0.019**	0.0105**	0.044*	0.0019	0.0044***
	1.23	2.25	2.33	1.72	1.51	4,41
g_{it-1}		0.015***				
		10.25				
g_{it}				0.0254**		
				2.25		
g_{it+1}						0.0058**
						1.98
$emerging_{it+k}$		0.00651***		0.0044***		0.00251***
		7.25		3.58		6.91
$constant$	0.0968**	0.061***	0.0205**	0.0053	0.0087	0.0098**
	2.38	7.78	1.99	0.08	0.25	2.54
$observations$	1364	1223	1220	1220	1287	1148
$Pseudo\ R^2$	0,343	0,3731	0.3244	0.3951	0.3478	0,3962

The table is divided into two panels. Panel A provides estimates for models 30 and 31, while panel B provides estimates for models 38 and 39:
$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \varepsilon_{it+k}$ (30)
$g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (31)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \varepsilon_{it+k}$ (38)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agoi_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agoi_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (39), Where: g_{it+k}represents the GDP growth rate of country i on date $t+k$, d_g_{it+k} represents the dummy that takes value 1 if on date $t+k$ the country i is above the median real GDP growth rate per capita, $\Delta lopag_{it}$the growth rate of the aggregate operating income of country i on date t, IFRS a dummy variable that takes value 1 if the country has adopted IFRS and 0 otherwise and the emerging variable is a dummy that takes value 1 if the country is considered emerging and 0 otherwise. Columns 1, 3 and 5 show the estimates of the model described by equation 30 in panel A and 38 in panel B, at the current date and for the horizons of 1 and 2 years ahead, respectively. Columns 2, 4 and 6 show the estimates of equation 31 in panel A and equation 39 in panel B for the same time horizons cited for equation 30. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% of significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

Table 11 reports the results for estimation models segregating earnings into cash flow and accruals. In addition to model results, the differences in inclination dummy coefficients between accruals and cash flows are also presented the test results that compares these coefficients. It is aimed to verify whether IFRS adoption affects the predictive capacity of aggregate earnings or accruals in a more noticeable way.

The product between aggregate accruals and IFRS dummy is significant in panel A for one period ahead and has a positive sign. This outcome indicates that, even though accruals do not explain GDP growth rate, this metric becomes significant after IFRS adoption. This result is associated to subjectivity reduction related to new accounting model, the same occurs to cash flows.

It is noticeable that, for a horizon of one period ahead, the difference in coefficients is significant and positive. This indicates that, on average, the additional effect of adopting IFRS on the relation between accounting data and economic activity is greater for accruals. This result validates hypothesis H2b, since the effect of IFRS is greater in informativeness of accruals compared to cash flows.

In general, the results indicate that, like earnings, cash flows are informative about future economic activity. Despite this, accruals do not explain real GDP growth, but IFRS adoption increases the impact of accruals and cash flows on economic activity. Furthermore, when comparing coefficients of cash flow and accruals, an incremental in accruals is more noticeable. Thus, it is expected that the increase in information generated by IFRS adoption is due to accruals.

TABLE 11: MODELS WITH CASH FLOW, ACCRUALS AND IFRS AS A GROWTH PREDICTOR

Panel A: Using g_{it+k} as a dependent variable

	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	34	35	34	35	34	35
$\Delta agcf_{it}$	0.0000381**	0.0000144*	0.0000246***	0.0000412***	0.00011*	0.0000477**
	2.25	1.97	4.52	2.95	1.69	2.05
$\Delta agacc_{it}$	0.0000433	0.0000556	-0.00000389	-0.0000353	2.10e-05	1.9e-05
	0.95	0.85	-1.19	-0.270	1.25	1.15
$IFRS_{it}$	0.015	0.0074	0.0055	0.00452	0.0041	0.0087
	0.36	1.44	0.85	1.25	1.33	0,25
$\Delta agcf_{it} x IFRS_{it}$	0.0006	0.0002	0.00011	0.00024**	0.00048	0.00044
	1.25	1.22	0.89	2.22	0.65	1.23
$\Delta agacc_{it} x IFRS_{it}$	0.0014	0.0004	0.00452**	0.0098***	0.0045	0.00052
	1.46	1.02	2.38	3.55	0.85	1.11
			Difference			
$\beta(\Delta agacc_{it} x IFRS_{it}) - \beta(\Delta agcf_{it} x IFRS_{it})$	**0.0008**	**0.0002**	**0.00441**	**0.00956****	**0.00402**	**0.000079**
g_{it-1}		0.042***				
		11.12				
g_{it}				0.0845**		
				2.02		
g_{it+1}						0.035***
						4.45
$emerging_{it+k}$		0.0085***		0.021***		0.010***
		6.62		4.52		3.04
$constant$	0.0322***	0.0404***	0.0330***	0.022***	0.033***	0.0215***
	3.66	4.98	14.25	18.78	3.55	16.55
$observations$	1432	1357	1355	1355	1354	1278

R^2	0,4444	0,5235	0,4541	0,5451	0,4412	0,5612
Panel B: Using d_g_{it+k} as a dependent variable						
	$k=0$		$k=1$		$k=2$	
$Estimated\ equation$	42	43	42	43	42	43
$\Delta agcf_{it}$	0.0128	0.0147**	0.0325**	0.0376*	0.0289**	0.0307*
	1.920	2.01	2.44	1.74	1.99	1.890
$\Delta agacc_{it}$	0.00306	0.0044	0.0025	-0.00544	0.00668	0.00775
	0.85	1.22	0.44	-0,95	1.02	1.25
$IFRS_{it}$	0.001	0.0024	0.0085	0.0023	0.022	0.0523
	0.66	1.39	0.667	0.354	0.24	1.025
$\Delta agcf_{it} x IFRS_{it}$	0.0012	0.0018	0.0066	0.00952	0.0021	0.00354
	1.09	1.42	0.35	0.85	1.45	1.52
$\Delta agacc_{it} x IFRS_{it}$	0.0045	0.0025	0.0089	0.0108*	0.0025	0.0015
	0.29	1.44	1.28	1.88	0.98	1.26
				Difference		
$\beta(\Delta agacc_{it} x IFRS_{it}) - \beta(\Delta agcf_{it} x IFRS_{it})$	**0.0033**	**0.0007**	**0.0023**	**0.00128**	**0.0004**	**-0.00204**
g_{it-1}		26.67***				
		11.03				
g_{it}				27.52***		
				11.25		
g_{it+1}						27.74***
						11.44
$emerging_{it+k}$		0.0066***		0.0021***		0.0028***
		6.7		4.41		2.99
$constant$	-0.150	-1.045***	-0.0243	-0.922***	-0.06	-0.988***
	-0.940	-7.27	-0.160	-6.890	-0.450	-7.860

$observations$	1364	1223	1220	1220	1287	1148
$pseudo\ R^2$	0,364	0,3845	0.3451	0.4012	0.3554	0,3978

The table is divided into two panels. Panel A provides estimates for models 34 and 35, while panel B provides estimates for models 42 and 43:
$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \varepsilon_{it+k}$ (34)
$g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (35)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \varepsilon_{it+k}$ (42)
$d\_g_{it+k} = \alpha_k + \beta_k \Delta agcf_{it} + \theta_k \Delta agacc_{it} + \lambda_k IFRS_{it} + \delta_k \Delta agcf_{it} * IFRS_{it} + \phi_k \Delta agacc_{it} * IFRS_{it} + \gamma_k g_{it+k-1} + \tau_k emerging_{it+k} + \varepsilon_{it+k}$ (43), Where: g_{it+k}represents the GDP growth rate of country i on date $t+k$, d_g_{it+k} represents the dummy that takes value 1 if on the date $t+k$ country i is above the median real GDP growth rate per capita, $\Delta agcf_{it}$the growth rate of the country's aggregate cash flows of country i on date t, $\Delta agacc_{it}$the growth rate of aggregate accruals of country i on date t,IFRS a dummy variable that takes value 1 if the country has adopted IFRS and 0 otherwise and the emerging variable is a dummy that takes value 1 if the country is considered emerging and 0 otherwise. Columns 1, 3 and 5 show the estimates of the model described by equation 34 in panel A and 42 in panel B, at the current date and for the horizons of 1 and 2 years ahead, respectively. Columns 2, 4 and 6 show the estimates for equation 35 in panel A and equation 43 in panel B for the same time horizons cited for equation 41. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported,for the aggregate accruals variable, in addition to reporting the test statistics, the differences between the accruals and cash flow coefficients are reported. Coefficients and differences marked with an asterisk (*) are statistically significant considering 10% of significance. Coefficients and differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients and differences marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

3.5 CONCLUSION

The third chapter of my study verifies whether internationally standardized accounting reports make aggregate numbers convey more information about countries' economic activity over the years. Additionally, it the analysis is aimed at discovering whether existing accruals and component subjectivity is reduced so it becomes informative about nations GDP growth.

Regarding IFRS adoption, it can be said that the hypothesis H1b raised in this chapter is confirmed, which leads to the conclusion that the aggregate profits are not only relevant to economic activity, but that the adoption of IFRS increases this informativeness.

This finding is a consequence of accounting information becoming more trustworthy and more reliable as countries converge to IFRS (Ashbaugh & Pincus, 2001; Barth et al., 2008; Landsman et al., 2012; Lima, 2010). Whether accounting data is predictive of economic growth (Gallo et al., 2016 and Konchitchki and Patatoukas, 2014) and IFRS increase data quality it is expected that accounting information has an even greater impact on growth rate of nations in countries that have converged to internationalized standards.

This result is relevant in terms of forecasting growth for public policy proposals, which, in the absence of accounting information in forecasting models, make errors which are pointed out by the literature (Konchitchki and Patatoukas, 2014, for example). Consequently, including accounting data not only reduces this forecasting error, but how this data is more decisive in forecasting in countries that have adopted IFRS.

When it comes to the subjectivity inherent of accounting information, accruals are not relevant. However, the fact that a country adopts IFRS makes this component significant and starts to convey information about economic activity for one period ahead. Such an event may be linked to an improvement in accounting information arising from the internationalization of standards and, consequently, a reduction in accruals component subjectivity.

The main contribution brought by my research in this chapter is associated with the discussion of an increase in predictive power of accounting data as a result of IFRS adoption. The literature points to an improvement in accounting numbers that are justified by adhering to international standards and is, in fact, capable of making accounting metrics more representative of the countries' economic activity. Thus, it can be said that including accounting information in models makes forecasts an improvement and this result is even more evident in countries that converged towards the internationalization of accounting standards. Still, it can be said that the biggest difference in information is related to accruals.

4 THE VALUE OF THE VALUEADDED STATEMENT TO ECONOMIC ACTIVITY FORECASTING

4.1 INTRODUCTION

One of the biggest challenges in accounting reports is communicating about information that presents company's economic reality to its users (Cosenza, 2003; Cunha, Ribeiro and Santos, 2005). According to the above mentioned authors, a good part of this problem has been solved from the preparation of financial statements considered as traditional, such as Balance Sheet, Income Statement, Statement of Owner's Equity and Explanatory Notes, which in general bring relevant information to stakeholders.

Stakeholders, however, do not always have the same level of relevant information. As an example, although the financial statements which have already been mentioned are highly informative for suppliers, investors and shareholders, this information is not that relevant for society surrounding this entity. This population would not have access to information linked to generated value by a company in its environment, as well as any employee who does not have access to related information (Cunha, Ribeiro and Santos, 2005; Cosenza, 2003). All these concerns, mainly regarding firm's social responsibility, culminated in adopting Social Balance, adhered by France in 1977, which became mandatory for companies with more than 300 employees.

For Tinoco (1984) social balance is an accounting document made available to society that demonstrates the association of the company to its surroundings, showing economic and social aspects. Within this report is included the value - added statement (VAS), which, for De Luca (1998), is often

seen as a surplus accounting statement evidenced accompanied by mandatory financial report.

De Luca (1998) defines the Value - added Statement (VAS) as a document of an economic nature that aims to show the wealth generated by an entity, as well as wealth distribution among agents that contributed to its existence. For Meek and Gray (1988), the statement provides information not only for shareholders, but for all stakeholders. Kroetz (2000) establishes a relationship between the concept of added value accounting and the added value linked to the economy, showing that the value - added statement is closely linked to the definition of GDP.

The value added statement (VAS) presents the wealth created and distributed to all stakeholders, but neither International Accounting Standards Board (IASB) nor Financial Accounting Standards Board (FASB) require firms to disclose this statement. Value added presented on VAS represent revenue sales deducted from inputs from acquired suppliers. Critics of VAS argue that it does not add information to investors because it resembles the income statement and it increases the firm's costs adding unnecessary disclosure efforts. Morley (1979, p.622) comments that an advantage of the VAS is that it links firms financial accounting to national income. Conceptually, the aggregation of value added generated by all firms within a country would equal the GDP. Thus, we expect that the firms' aggregate value added is positively correlated to both current and future GDP.

Because GDP data is usually available with considerable delay, researchers and practitioners have incorporated more timely information in models that can anticipate GDP. Bridge models, for example, consider timely

updated indicators in addition to the benchmark models that use lagged GDP information for GDP forecasting (see Baffigi et al., 2004; Angelini et al., 2011). Models that consider timely monthly releases to estimate current quarter GDP, the so called now-casting models, have been explored in research (Angelini et al., 2011; Aastveit et al., 2014) and used in practice (see https://fred.stlouisfed.org/series/STLENI).

However, most of the indicators used in bridge models, and now-casting models, are related to macroeconomic or microeconomic variables. More recently, Konchitchki and Patatoukas (2014) document that aggregate accounting earnings growth is an incrementally significant leading indicator of growth in GDP. Konchitchki and Patatoukas (2014) and Gallo et. al (2016) have pointed out that aggregate accounting data convey information about future economic parameters, such as real GDP growth rates (Konchitchki and Patatoukas, 2014) and interest rates implemented based on monetary policy (Gallo et. al, 2016).

My article contributes to this stream of literature and investigates whether value added conveys information about GDP growth. It is also verifying whether VAS data is a better indicator of GDP growth than accounting earnings and cash flows.

Specifically, I explore a scenario in which VAS is mandatory, standardized, and audited for public companies. Based on this scenario, it is investigated, by analysis and comparison of coefficients, if VAS data convey information about GDP growth and if this information level is greater than the informativeness of earnings and cash flows.This approach is consistent with

Van Staden and Vorster (1998), who found evidence that value added has greater predictive power than earnings.

To implement our analysis, we benefit from the change in Brazilian Corporate Law in 2008, which required public companies to prepare and release VAS as a mandatory financial statement. The mandatory disclosure led to the creation of CPC - 09, which regulates the preparation and disclosure of the statement.

For analysis, I use aggregate quarterly data, ranging from the first quarter of 2010 to the third quarter of 2019. For aggregation, all information available from B3 companies are used, which corresponds to approximately 341 firms per date, on average. The aggregation process consists in sum of the accounting variables of all companies on each date scaled by assets. Developed models are estimated with GDP growth in until 4 quarters ahead as dependent variable. Also, aggregate value added growth rate (gross and net) is presented as an explanatory variable. These models are also controlled by economic activity in previous quarter GDP growth. The inclusion of these controls aims to eliminate from the main coefficient any relation effect that aggregate accounting data has with the GDP growth of the previous quarter. The same procedure is performed to earnings and cash flow metrics in order to verify if VAS conveys more information about GDP growth rate.

The main results indicate that, on average, aggregate value added data (net and gross) convey information on future growth GDP. This result is compatible with Konchitchki and Patatoukas (2014) on the informativeness of aggregate accounting data, as well as Gallo et al (2016) which shows the informativeness of accounting data on interest rates. However, the present work

shows that value added is more informative about future economic activity than profits and cash flow. This result is evidenced by the significant difference between coefficients of value added compared to measures of earnings and cash flows.

The main contribution is in the evidence on VAS data relevance. This result signals the importance of preparing and disclosing this demonstration, elucidating the need for implementation by FASB and IASB, which today do not make it mandatory. The obligated demonstration would allow a better estimate of future GDP and consequently economic policies, as well as investment decisions, which would be executed with less uncertainty about the direction of the economy.

After this, this chapter is divided into 4 more sections. Initially, the prior literature and hypothesis development seeks to make a general overview of previous literature on the topic. Then research design demonstrates models and statistical treatments the data is submitted. A results section, pointing out the model estimates and a topic for the main conclusions.

4.2 PRIOR LITERATURE AND HYPOTHESES DEVELOPMENT

4.2.1 The value added statement and its relevance

Cosenza (2003) affirms that traditional accounting information started to not fully answer users demand, which does not have its main questions answered from these statements. This fact is a consequence to social, political, and economic changes, that have a direct impact on business environment. The author also states that among accounting documents generated, there is the value added statement in order to supplement accounting content to different stakeholders. Further, states that information generated by VAS is highly relevant for social purposes, since economic entities have social responsibilities to fulfill.

For Sharma (2009) the value added, which is VAS outcome, can capture value generation. Further, such demonstration is a company's performance measure, since there is no possibility to grow or even persist without generating value. According to CPC – 09, value added is the company's generated wealth, measured by the difference between all revenue and inputs purchased from third parties

According to De Luca (2009), only a few nations make value added demonstration disclosure mandatory, meanwhile International Accounting Standards Board (IASB) encourages preparing and propagating the demonstration. In 2008, the Brazilian congress approved a law, applied to publicly-held companies and others required by specific law, making mandatory the preparation and disclosure of VAS, according to item 3 of the NBC TG 09,

approved by Resolution CFC 1.138/08 and amended by Resolution CFC n.º 1.162/09.

Cosenza (2003) mentioned in his work that most non-mandatory firms do not develop nor disclose VAS in the international scenario, even if International Accounting Standards Board - IASB advises its disclosure. Only a minority of obligation exempt firms disclose this information. Even though, those that disclose this report make measurements according to their own interests considering the cost and benefit of such disclosure (Deegan and Hallam, 1991; Gallizo & Mcleay, 1989).

According to Silva & de Almeida (2014) even before requirement, some companies voluntarily disclosed VAS in Brazil, influenced by parties that required more financial information from companies. Oshiro (2003) points that some European countries as well as Brazil have obligated preparation and disclosure of IFRS, because these countries are interested in exposing a firm's social contribution.

According to Mandal and Goswami (2008) gross value added refers to the sum of sales and revenue from other services less materials and services purchased from third parties. While net value added refers to gross value added minus depreciation and amortization. Therefore, net value added is the sum of value added to employees, financiers, and owners. For Cosenza (2003) gross value added is a result of company's common activity. Which means the sale's recognition and, simultaneously, production costs deduction, as well as goods and services used to generate the revenue. Moreover, net value added is a consequence from all company's activities, defined as the confrontation of all entries with all expenses for a period. The main difference between these

metrics is the depreciation and amortization which is deducted in net value added case.

Cosenza (2003) states that the first records of value added applications were originated in the United States during the 1920s and was used as a basis to calculate government incentive payment systems. However, Knell (1986) says, as a concept, value added has been known for over two hundred years in a macroeconomic approach.

The destination of firm's generated value is divided into workers, governments, creditors and shareholders remuneration (Cosenza, 2003). Larraz (1990a) affirms that workers' remuneration is characterized as the most important one when it comes to generated value division, because this category summarizes all expenses spent on personnel in return of the work done that generated firm's value. Also, for the author, government remuneration is related to paid taxes associated to tax incentives and infrastructure generated. In addition, shareholder remuneration is the return on resources invested on company, as dividends or interest on equity. Finally, creditors remuneration is related to third parties' assets, as loans' financial costs to generate value in the firm.

Cunha, Ribeiro and Santos (2005) affirm that VAS, besides identifying the origin of wealth entirely generated by company, allows measurement of wealth received in transfer, as well as mapping the distribution of wealth generated to different stakeholders in charge for that.

Freire and Rebouças (2001), otherwise, cite weaknesses in the value added statement as a measurement of company's social effect. The authors state that VAS does not completely capture the company's social information.

However, Santos (1999) clarifies that value added statement creation wasn't intended to disclose all relevant information to measure social effect. Also, he says that VAS is the clearest way to explain value generation capacity, as well as wealth distribution.

Morley (1979) points out five main advantages of VAS elaboration. First, it clarifies companies' objectives and it improves employee's performance. The second advantage is that it is easier to use bonus systems for productivity. Third, the ratio between value added and payroll can bring diagnoses about the company's health. Fourth, it informs about size and importance of the company to its environment. The fifth is that the VAS has linked the company's account to national income concept. For these reasons, Meek and Gray (1988) suggested that American companies consider including VAS in their financial statements, but not as a disclosure obligation, but that each company analyze the cost and benefit of including the statement and so choose to prepare the document.

In the literary review carried out by Stainbank (2009), the main reasons associated to the voluntary disclosure of value added statement in South Africa are pointed out and ranked. The two main reasons addressed by the literature is the possibility of identifying how value is generated was distributed among stakeholders and the importance of demonstration to generate sustainability reports. Santos, Botinha and Lemes (2019) developed research in order to verify if the informational content of value added statements is relevant for investors. As their conclusions, the authors showed that net value added impacts the stock market at different levels of corporate governance. However, earnings per share are more relevant to investors than net value added. It was evidenced that there is concern about firm's transparency and demonstration of

value added contributes to increase accountability. Rodrigues, Elias and Campos (2015) also showed that value added statement has relevant information content to investors.

Other research also focuses on analyzing the informational content of the numbers found in the value added statement. Machado et. al (2015) and Barros et. al (2013) found results that net value added is linked to shares price of companies in Brazilian market. Stanzani et al. (2016) conclude that VAS is relevant to explain both share return and stock market. Controversial to these results, Martins, Machado and Callado (2014) affirm that stock returns are not related to VAS content.

4.2.2 The value added, GDP and aggregate accounting data

Evraert and Belkaoui (1998) say that, based on VAS numbers, stakeholders can obtain information about generated wealth and how is distributed among its agents. Also, express that numbers found in VAS is superior to income statement, which only informs wealth generated by owner's perspective.

Mandal and Goswami (2008) assert the definition of income from an aggregation is not recent and was initially introduced to calculate national income. Cox (1979) defines it as production of goods and services for a period. Kroetz (2000) establishes a relation between value added accounting concept and value added linked to economy. According to the author, through value added statement, it is possible to verify the economic contribution from each company and its sector, thus constituting GDP generated by a firm.

In the same context, Santos and Lustosa (1998) affirm that value added distribution among its agents is equivalent to national income concept because the transformation of intermediate resources into final goods only occurs due to production factors. The authors complement that remuneration of production factors represents the income hold to society, which returns to the company as consumption or financing, restarting economic cycle.

De Luca (1998) states that the value added statement is usable to calculate GDP based on measuring value added in different sectors (financial, trade and service). Moreover, numbers found in VAS can also provide information on decision making regarding analysis of investment, national, sectorial or regional product. However, Cosenza (2003) states that there are VAS characteristics which are not able to measure the internal product, as VAS only reports a company's value added in general, regardless of if the wealth produced is sold.

There is literature that points to use aggregate accounting data to forecast economic data (Konchitchki and Patatoukas, 2014 and Gallo et, al., 2016). Konchitchki and Patatoukas (2014) cite GDP as the most important measuring of economic activity around the world and is very relevant on economic policy decisions. These findings are supported by Fischer and Merton (1984), which clarify that corporate earnings are a GDP component and these earnings are related to other elements of GDP.

Earnings, when aggregated, other than conveying information about GDP growth rate in the period ahead, are also informative over monetary policy established in American market (Gallo et. al, 2016). This evidence was questioned after finding a negative relation between earnings and returns from

an aggregate perspective discovered by Kothari et al. (2006) and Cready and Gurun (2010).

As a result of exposed literature, two hypotheses are formulated:

H1c: The value added is informative about future economic activity in Brazil.

H2c: The value added conveys more information about Brazil's future economic activity when compared to earnings and cash flows.

4.3 RESEARCH DESIGN

This chapter aims to verify whether value added (gross and net), as well as aggregate earnings, is informative when it comes to quarterly real GDP growth rate. In addition, investigate whether such metric is more informative about economic activity when compared to aggregate earnings and cash flows.

Valor-Pro Accounting database, from Valor Econômico platform, is used to extract quarterly data from accounts of value added statements and other accounting metrics, while economic data of real GDP growth rate were extracted from IPEA database.

Value added statement mandatory elaboration and disclosure only after 2010 restrict my sample to data between 2010’s first quarter to 2019's third quarter, thus totaling 39 observations of Brazilian market. Each observation is generated from a set of data from B3 companies. An average of more than 340 companies listed on B3 is used on each date.

4.3.1 Data aggregation

To achieve this study objective, is necessary to aggregate accounting data not only for earnings and cash flows, but also for firm’s value added gross and net value added. value added

Thus, for each quarter used, net income, operating income, cash flow, accruals, gross value added, and net value added data from each company are aggregated. These items are weighted by its company’s assets on each date. In all expression below, I represent a company and t represents the quarter studied.

$$aggregate\ net\ income_t = agni_t = \sum_{i=1}^{n} \frac{net\ income_{it}}{total\ assets_{it}} \quad (44)$$

$$aggregate\ operating\ income_t = agoi_t = \sum_{i=1}^{n} \frac{operating\ income_{it}}{total\ assets_{it}} \quad (45)$$

$$aggregate\ operating\ cash\ flow_t = agcf_t = \sum_{i=1}^{n} \frac{operating\ cash\ flow_{it}}{total\ assets_{it}} \quad (46)$$

$$aggregate\ accrual_{it} = agacc_t = \sum_{i=1}^{n} \frac{accrual_{it}}{total\ assets_{it}} \quad (47)$$

$$aggregate\ gross\ added\ value_{it} = aggav_t = \sum_{i=1}^{n} \frac{gross\ added\ value_{it}}{total\ assets_{it}} \quad (48)$$

$$aggregate\ net\ added\ value_{it} = agnav_t = \sum_{i=1}^{n} \frac{net\ added\ value_{it}}{total\ assets_{it}} \quad (49)$$

4.3.2 Models

The main objective is to analyze value added informativeness on GDP growth. However, the need to compare value added informativeness to different metrics of earnings and cash flows, induces to estimate models for all metrics only for Brazil.

Each model presented is estimated 5 times. First using aggregate accounting component on the same date of GDP growth rate, the second with the real GDP growth rate per capita to one period ahead. For the other three times this process is repeated recursively, in order to analyze the impact of

each accounting metric on GDP growth rate per capita until four quarters ahead.

The first models are given by equations 50 and 51, which consider net and gross value added as aggregate accounting metrics:

$$g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \varepsilon_{t+k} \quad (50)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \varepsilon_{t+k} \quad (51)$$

Where the dependent variable, g_{t+k}, represents the real GDP growth per capita in Brazil for quarters $t + k$, with k ranging between 0 and 4, compared to the same quarter in previous year. The dependent variables (in different models), $\Delta aggav_t$ and $\Delta agnav_t$, represent the country's aggregate value added growth on date t in relation to the date $t - 4$. The same models are estimated for k varying between 0 and 4, which allows analyzing if value added growth present information is predictive of future GDP growth even in four quarters ahead.

Models described by equations 52 and 53 are estimated as follows:

$$g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (52)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (53)$$

Equations 52 and 53 differ from those previously presented (50 and 51) by adding control of real GDP growth rate of a period before. The purpose of adding this control is splitting the effect of aggregate accounting data from past economic activity.

The same models are estimated by changing aggregate accounting variable so comparison can be performed. Thus, models are estimated:

$$g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \varepsilon_{t+k} \quad (54)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (55)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agoi_t + \varepsilon_{t+k} \quad (56)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agoi_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (57)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \varepsilon_{t+k} \quad (58)$$

$$g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (59)$$

The models described by equations 54 to 59 has variables with variability over time, since it is only Brazil and not a panel database as previously presented. In addition, to calculate accruals, the methodology described by Sloan (1996)[7] is used.

Finally, is used in each model mentioned above, a dummy variable that measures whether growth rate of Brazilian real GDP, on a date, is above or below variable median:

$$d\_g_{t+k} = \begin{cases} 1 \; if \; ns \; date \; t+k, g > median \\ 0 \; otherwise \end{cases} \quad (60)$$

The previously defined models are also estimated using a dummy as dependent variable, which results in equations 61 to 70.

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \varepsilon_{t+k} \quad (61)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \varepsilon_{t+k} \quad (62)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (63)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (64)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \varepsilon_{t+k} \quad (65)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (66)$$

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[7] All growth rates here are also calculated for the same quarter last year.

$accruals = (\Delta CA - \Delta cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep$

ΔCA is Variation in current assets, $\Delta cash$ is Variation of cash and equivalents, ΔCL is Variation of current liabilities, ΔSTD is Variation of short-term debt ΔTP is Variation of income tax payable Dep is Depreciation and amortization expense.

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \varepsilon_{t+k} \quad (67)$$

$$\text{d}\_g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (68)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \varepsilon_{t+k} \quad (69)$$

$$d\_g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k} \quad (70)$$

The models described by equations 50 to 59 are estimated by ordinary least squares (OLS), while equations 61 to 70 are estimated by a Probit, since dependent variables are dummies.

To verify my second hypothesis, additional tests are needed. So, is necessary to perform Chow tests to compare coefficients in different models because is intended to compare aggregate value added coefficient (gross and net) to coefficients of earnings metrics and cash flow.

4.4 RESULTS

Before discussing the results, it is important to highlight that the data used represent a large proportion of GDP. The sum proportion of gross value added, and net value added of publicly held companies represent almost 50% of GDP in 2019.Figure 3 shows the number of firms listed in B3 and the number of companies with information available in the database used. The sample representativeness in relation to the total number of publicly held companies explains the high percentage that value added represents in relation to GDP. The average is 341 companies per quarter used in aggregation, which represents more than 95% of listed companies.

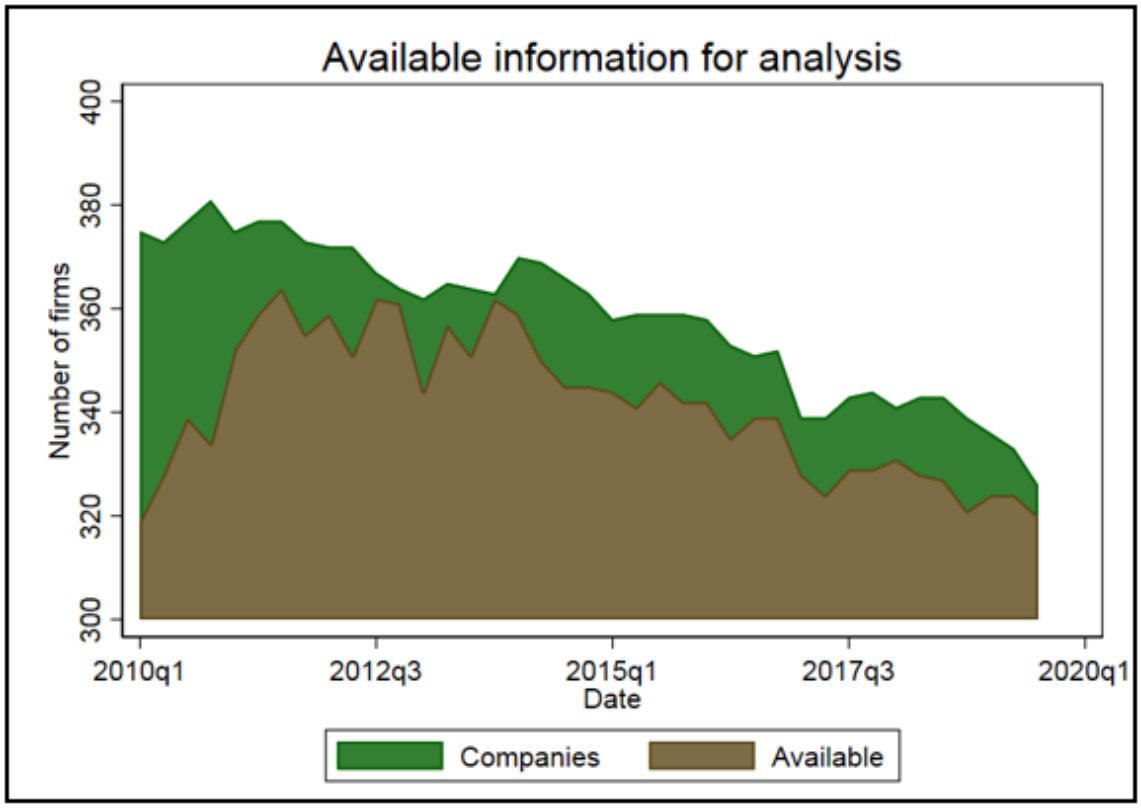

Figure 3: Number of listed firms (according to Valor Data) and available information.
Source: Author's own elaboration

Table 12 reports descriptive statistics of main variables studied. In the period analyzed, on a quarterly basis, the average real GDP growth rate was

1.39% in relation to respective quarter of previous year. The measure of economic activity proves to be highly volatile. The lowest real GDP growth rate was seen in the last quarter of 2015, reaching a negative rate of 5.53%. During the sample period, the peak of growth variable occurred in the first quarter of 2010, achieving 9.21%.

When it comes to accounting variables, the average growth rates of aggregate gross and net value added are 4.52% and 5.21%, respectively and are slightly dispersed. It indicates that aggregate data derived from value added statements vary considerably over quarters between 2010 to 2019.

Among accounting variables, cash flows and accruals aggregate metrics are the most dispersed, specially accruals. This result indicates greater uncertainty and is more subjective to explain real GDP growth rates.

TABLE 12: DESCRIPTIVE STATISTICS – BRAZILIAN DATA

$Variable$	$Obs.$	$Mean$	$C.var.$	$Minimum$	$1st\ quart$	$Median$	$3rd\ quart$	$Maximum$
g_t	39	0.0139	2.39	-0.0553	-0.0044	0.0145	0.0276	0.0921
$\Delta aggav_t$	39	0.452	0.98	-0,124	0.0052	0.328	0.519	1.021
$\Delta agnav_t$	39	0.521	0.79	-0.092	-0.002	0.554	0.598	0.854
$\Delta agni_t$	39	0.227	1.28	-0.985	-0.395	0.015	0.758	2.553
$\Delta agoi_t$	39	0.071	1.44	-0.022	-0.002	0.051	0.097	0.177
$\Delta agcf$	39	0.568	4.12	-0.182	0.005	0.498	0.558	1.028
$\Delta agacc_t$	39	0.736	8.52	-0.214	-0.025	0.214	0.652	1.425

The table presents some statistics of the main study variables, where: g_t represents the growth rate of Brazil's GDP on date *t*.,$\Delta agni_t$, the growth rate of aggregate net income on date *t*, $\Delta agoi_t$ the growth rate of aggregate operating income on date *t*, $\Delta agcf_t$the growth rate of aggregate cash flows on date *t* according to Sloan (1996), $\Delta agacc_t$ the growth rate of aggregate accruals on date *t* according to Sloan (1996), $\Delta aggav_t$ the growth rate of gross value added on date *t* and $\Delta agnav_t$ the growth rate of the net value added on date *t.*

Source: Author's own elaboration

Table 13 reports the correlations among main variables presented in this paper. I inserted metrics for growth rates of four periods ahead. Note that when it comes to Brazil's economic activity from a date ahead of the growth rates of

aggregate accounting variables, all these accounting metrics are statistically significant, except for aggregate accruals.

The results for two and three dates ahead are statistically significant as well as all correlations of GDP growth rate to aggregate accounting metrics, except aggregate accruals (net income, operating income, cash flows, gross value added, and net value added). However, for fourth quarter ahead, accounting informativeness is only statically significant for operating income and value added statement, net and gross, are significantly correlated to economic activity.

It is important to note that, among accounting metrics that are statistically significant related to GDP growth rate, all metrics are less informative for economic activity forecast for longer periods.

Although econometric models have not been addressed yet, evidence points to the validation of my hypotheses, since aggregate VAS data are correlated to future GDP growth rates and these correlations are stronger than others.

TABLE 13: CORRELATION ANALYSIS

	g_t	g_{t-1}	g_{t+1}	g_{t+2}	g_{t+3}	g_{t+4}	$\Delta agni_t$	$\Delta agcf_{t_t}$	$\Delta agacc_t$	$\Delta agop_t$	$\Delta aggav_t$	$\Delta agnav_t$
g_t	1											
g_{t-1}	0.5288***	1										
g_{t+1}	0.4710***	0.2863*	1									
g_{t+2}	0.2767**	0.1965**	0.5036***	1								
g_{t+3}	0,2151**	0.0912	0.3912*	0.421**	1							
g_{t+4}	0,1452	0.0442	0.1221*	0.321*	0.445**	1						
$\Delta agni_t$	0.0657*	0.0214	0.0593**	0.0494***	0.0421**	0.0218	1					
$\Delta agcf_t$	0.0976**	0.0160	0.0390**	0.0329**	0.0140*	0.0052	0.398***	1				
$\Delta agacc_t$	0.0620	-0.0396	0.0164	-0.0642	0.0244	0.0977	0.219**	-0.219**	1			
$\Delta agop_t$	0.0701*	0.0183*	0.0856***	0.0850**	0.077*	0.0552**	0.652***	0.3120**	0.1985***	1		
$\Delta aggav_t$	0.0915*	0.0935*	0.0970***	0.0961***	0.0721**	0.0715**	0.322**	0.195**	0.0659**	0.412***	1	
$\Delta agnav_t$	0.1052**	0.0512	0.1108***	.01012***	0.0917***	0.0877*	0.3445***	0.01982	0.0988*	0.4414**	0.9121***	1

The values presented represent the correlations between the study variables, which are: $g_t$represents the growth rate of Brazil's GDP on date t, $\Delta agni_t$ the growth rate of aggregate net income on date t, $\Delta agop_t$ the growth rate of aggregate operating income on date t, $\Delta agcf_t$the growth rate of aggregate cash flows on date t according to Sloan (1996), $\Delta agacc_t$ the growth rate of aggregate accruals on date t according to Sloan (1996), $\Delta aggav_t$ represents the growth rate of gross aggregate value added and $\Delta agnav_t$ the growth rate of the net value added on date t. Correlations marked with an asterisk (*) are statistically significant with 10% significance, correlations marked with two asterisks are statistically significant at 5% significance and correlations marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

Table 14 shows estimations related to models described by equations 50, 52, 61 and 63, the ones that gross value added is an explanatory variable. The first panel shows equations' estimations for GDP growth rate as dependent variable and the second shows estimations for a dummy that evaluate whether growth rate is above or below the median.

Gross value added, in the first panel, is statistically significant to explain real GDP growth rate for any forecast horizon. This result remains relevant even when not controlled by economic activity of previous period. This result is also valid for the date of aggregate accounting information used in the model. Moreover, the coefficients are positive, suggesting that, on average, higher aggregate gross value added growth rates indicate a higher real GDP growth rate for present and future forecast. This relation explicit that VAS is informative over GDP prediction. This finding goes against my first hypothesis.

It can be noted that as forecast horizon increases, coefficients of aggregate accounting variable and confidence level that makes these coefficients significant are reduced. Thus, the impact of gross value added on GDP growth rate becomes less relevant for a more distant forecast. Consequently, these metrics have greater capacity to impact GDP in quarters closer to accounting data occurrence of companies listed in B3.

Furthermore, using growth rate before the forecast date as control variable presents positive signs and is statistically significant in all scenarios. These indicate a movement towards GDP growth rate in relation to its history. In the second panel the coefficients behave the same and the significance are

similar. So, on average, higher growth rates in gross aggregate value added increase the likelihood that GDP growth rate will exceed the median rate.

TABLE 14: MODELS WITH GROSS VALUE ADDED AS A GROWTH PREDICTOR

Panel A: Using g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$Estim.eq.$	50	52	50	52	50	52	50	52	50	52
$\Delta aggav_t$	0.00151*	0.00125**	0.00241***	0.00184***	0.00192**	0.00181***	0.001884**	0.001625**	0.001354*	0.001512*
	1.13	0.930	4.21	3.91	2.12	3.66	2.08	2.00	1.75	1.69
g_{t+k-1}		0.0156***		0.0125***		0.0098**		0.01165***		0.01025**
		6.62		5.56		2.02		5.56		2.12
$Constant$	0.0154***	0.0101***	0.00917**	0.0122***	0.00885*	0.00801***	0.00742***	0.00852**	0.0055**	0.00625*
	12.12	18.19	2.17	2.88	1.77	4.67	5.52	1.98	2.09	1.85
$Observations$	39	38	38	38	37	37	36	36	35	35
R^2	0.1021	0.4425	0.1112	0.5123	0.1009	0.3925	0.0998	0.3325	0.0754	0.4212

Panel B: Using d_g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$Estim.\ eq.$	61	63	61	63	61	63	61	63	61	63
$\Delta aggav_t$	0.00111*	0.001329***	0.00225**	0.00195***	0.001774**	0.001245*	0.001123*	0.00125**	0.001025	0.00094
	1.69	4.52	2.09	3,34	1.99	1.69	1.77	1.97	1.44	1.23
g_{t+k-1}		0.0098***		0.0094***		0.01025**		0.0098**		0.0112***
		10.11		5.55		2.14		2.11		5.25
$Constant$	0.014***	0.011***	0.0785***	0.0077***	0.0102*	0.0098	0.01325**	0.01124*	0.0092**	0.0112**
	3.36	6.77	8.84	7.98	1.78	0.98	2.00	1.77	1.98	2.08
$Observations$	39	38	38	38	37	37	36	36	35	35
$Pseudo\ R^2$	0.1344	0.515	0.175	0.52	0.0984	0.326	0.0912	0.3321	0.0844	0.3332

The table is divided into two panels. Panel A provides estimates for models 50 and 52, while panel B provides estimates for models 61 and 63:
$g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \varepsilon_{t+k}$ (50)
$g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$ (52)
$d\_g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \varepsilon_{t+k}$ (61)
$d\_g_{t+k} = \alpha_k + \beta_k \Delta aggav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$ (63), where: $g_t$represents the growth rate of Brazil's GDP on date *t*, $\Delta aggav_t$ the growth rate of gross value added. Columns 1, 3, 5, 7 and 9 present the estimates of the model described by equation 50 in panel A and 61 in panel B, at the current date and for the horizons of 1 to 4 quarters ahead, respectively. Columns 2, 4, 6, 8 and 10 show the estimates for equation 52 in panel A and equation 63 in panel B for the same time horizons. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% level of significance. Coefficients marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

Table 15 shows the results regarding models' estimations described by equations 51, 53, 62 and 64, which uses aggregate net value added as an accounting metric for economic activity forecast. The first panel refers to estimates of models 51 and 53, while the second refers to equations 62 and 64.

The results in panel A and B are consistent to those in table 14. In the first panel, aggregate accounting variable proves to be statistically significant and presents a positive sign for all forecast horizons and for present date. Thus, on average, periods in which aggregate net value added growth rate from B3 listed firms are higher is expected higher GDP growth rates from this date and up to four quarters ahead. These results are consistent in panel B of the table, indicating that higher aggregate net value added growth rates positively boost the probability that GDP growth rate is above its variable median in up to four quarters ahead.

Since gross and net value added are shown as metrics that explain economic activity in Brazil, my first hypothesis (H1C) is valid. Thus, these variables are informative over future economic activity.

TABLE 15: MODELS WITH NET VALUE ADDED AS A GROWTH PREDICTOR

Panel A: Using g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$Estim.eq.$	51	53	51	53	51	53	51	53	51	53
$\Delta aggav_t$	0.00181**	0.00142**	0.00248***	0.00201***	0.00193***	0.001874**	0.001984**	0.002145*	0.001524*	0.00161**
	2.11	2.18	4.75	3,69	2.77	1.97	2.19	1.69	1.79	2.22
g_{t+k-1}		0.0154***		0.0134***		0.0092**		0.01065***		0.00925**
		7.02		7.14		2.02		3.31		2.12
$Constant$	0.0114***	0.0111*	0.01019*	0.0128**	0.00805*	0.00601**	0.00628***	0.00721*	0.0082**	0.00825*
	7.42	1.89	1.77	2.21	1.74	2.12	7.12	1.79	2.10	1.87
$Observations$	39	38	38	38	37	37	36	36	35	35
R^2	0.1134	0.4825	0.1312	0.5212	0.1109	0.4135	0.1098	0.3825	0.0924	0.4412

Panel B: Using d_g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$Estim.\ eq.$	62	64	62	64	62	64	62	64	62	64
$\Delta aggav_t$	0.00141**	0.001629***	0.002245**	0.00206***	0.001844*	0.001445*	0.001113*	0.00135*	0.001175**	0.00105*
	2.05	12.25	2.18	3.77	1.69	1.77	1.89	1.92	2.08	1.83
g_{t+k-1}		0.0108***		0.0084***		0.0109***		0.0088**		0.0109***
		5.62		5.57		2.44		2.13		5.82
$Constant$	0.023***	0.0092***	0.0895***	0.0079*	0.0113*	0.0102*	0.01125**	0.01424*	0.0102**	0.0082*
	3.19	5.12	12.21	1.98	1.88	1.78	2.20	1.79	2.00	1.88
$Observations$	39	38	38	38	37	37	36	36	35	35
$Pseudo\ R^2$	0.1454	0.534	0.165	0.542	0.1024	0.356	0.0812	0.5321	0.01044	0.3432

The table is divided into two panels. Panel A provides estimates for models 51 and 53, while panel B provides estimates for models 62 and 64:
$g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \varepsilon_{t+k}$ (51)
$g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$ (53)
$d\_g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \varepsilon_{t+k}$ (62)
$d\_g_{t+k} = \alpha_k + \beta_k \Delta agnav_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(64), where: $g_t$represents the growth rate of Brazil's GDP on date t, $\Delta agnav_t$ the growth rate of net value added. Columns 1, 3, 5, 7 and 9 show the estimates of the model described by equation 51 in panel A and 62 in panel B, on the current date and for horizons 1 to 4 quarters ahead, respectively. Columns 2, 4, 6, 8 and 10 show the estimates for equation 53 in panel A and equation 64 in panel B for the same time horizons. The models in panel A are estimated by OLS and the models in the second panel by Probit. Below each coefficient the respective test statistics are reported. Coefficients marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients marked with two asterisks (**) are statistically significant considering a 5% level of significance. Coefficients marked with three asterisks (***) are statistically significant at 1% significance.

Source: Author's own elaboration

Table 16 shows the results related to my second hypothesis, which states that net and gross value added have a greater impact on future GDP growth rate in comparison to the effect of net income, operating income and cash flows. I report only the main coefficients of each model, which are coefficients relative to each aggregate accounting metric. For comparison between net and gross value added effects, the difference between each coefficient is calculated (for net income, operating income, and cash flows) and the coefficients reported in tables 14 and 15 regarding gross and net value added impact on economic activity, respectively.

In the first panel of the table, where real GDP growth rate is dependent variable, aggregate net income is predictive of growth rate in almost all horizons estimated for Brazil and regardless of controlling economic activity of past date, except for the third period and without the control. The calculated differences are all negative and statistically significant for all time horizons, controlling or not. The result indicates that there is a significant difference between aggregate net income impact in relation to aggregate net and gross value added impact. The negative sign found suggests that value added metrics effects found have a greater impact on the GDP growth rate of up to four quarters ahead when compared to the effect of aggregate net income. This result is similar in panel B, that is, the informativeness of gross value added and net value added is greater than the informativity of the aggregate net profit on the probability of being above the median of the growth rates.

Still in panel A, operating income is statistically significant for all forecast horizons, indicating that this metric, when aggregated, positively affects real GDP growth rate. The differences calculated between coefficients of this

variable and VAS numbers, as well as aggregate net income are all negative. Although, these metrics show statistical significance only in the first forecast periods. Gross value added, however, does not present significance for the third forecast period controlling for economic activity, while there is a difference between the impact of operating income and net value added in the same case. This difference is a consequence of accounts that differ from gross value added to net value added, more specifically, retentions, depreciation, amortization and depletion. Even so, difference for both metrics, in fourth quarter, is not statistically significant in relation to operating income. Thus, operating income has a smaller impact on real GDP growth rate in Brazil only in forecasts up to three quarters ahead, however, this difference is not perceived for oneyear horizon.

The results for aggregate operating income in panel B are consistent to those of Panel A, but the difference is that for three and four periods ahead there is no evidence that the differences are significant, regardless value added type. Thus, value added effect is, on average, greater in the probability of being above median growth when compared to operating income effect. However, there are no differences between these effects on growth of three or four quarters ahead.

The aggregate cash flows are informative about the economic growth dummy. This relation is consistent for one, two or three dates ahead. As for the differences, there is statistical significance in all specifications and in all forecast horizons in the two panels. All differences show negative signs, which evidence that aggregate cash flows effect is smaller than the effect of metrics found in

value added statements on growth and on the probability of this rate being higher than the median of rates.

In general, findings in table 16 corroborate my second hypothesis (H2c). For any forecast horizon and for any specification, the two value added metrics impact GDP growth rate more clearly than cash flows and net income. However, this evidence is true for aggregate operating income only for the first two quarters, with no difference between the long-term effects. The fact that value added found in VAS is closely linked to GDP definition allows me to state that these metrics are better to explain future economic activity.

TABLE 16: MODELS WITH NET INCOME VALUE AS A GROWTH PREDICTOR

Panel A: Using g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$\Delta agni_t$	0.00054 *	0.00049 **	0.00073 ***	0.00061 ***	0.00068 **	0.00065 *	0.00057	0.00058 **	0.00059 *	0.00062 **
$\beta(\Delta agni_t) - \beta(\Delta aggav_t)$	-0.00097 *	-0.00076 *	-0.00168 ***	-0.00123 **	-0.00124 **	-0.00116 **	-0.001314 *	-0.001045 *	-.000764 *	-0.00089 **
$\beta(\Delta agni_t) - \beta(\Delta agnav_t)$	-0.00127 **	-0.00093 *	-0.00175 ***	-0.0014 ***	-0.00125 ***	-0.001224 **	-0.001414 *	-0.001565 *	-.000934 **	-0.00099 **
$\Delta agoi_t$	0.00091 **	0.00085 *	0.00125 ***	0.00112 ***	0.00101 ***	0.00098 ***	0.00102 *	0.00113 **	0.00084 **	0.00095 *
$\beta(\Delta agoi_t) - \beta(\Delta aggav_t)$	-0.0006 *	-0.0004 **	-0.00116 ***	-0.00072 ***	-0.00091 **	-0.00083 **	-0.000864 *	-0.000495	-.000514	-.000562
$\beta(\Delta agoi_t) - \beta(\Delta agnav_t)$	-0.0009 **	-0.00057 *	-0.00123 ***	-0.00089 **	-0.00092 *	-0.000894 *	-0.000964 **	-0.001015 *	-.000684	-.000660
$\Delta agcf_t$	0.00084	0.00071	0.00102 ***	0.00111 ***	0.00094 *	0.00101 *	0.00088 **	0.00079 **	0.00087	0.00069 *
$\beta(\Delta agcf_t) - \beta(\Delta aggav_t)$	-0.00067 **	-0.00054 ***	-0.00139 ***	-0.00073 ***	-0.00098 *	-0.0008 **	-0.001004 *	-0.000835 **	-.000484 *	-.000822 *
$\beta(\Delta agcf_t) - \beta(\Delta agnav_t)$	-0.00097 ***	-0.00071 ***	-0.00146 ***	-0.0009 ***	-0.00099 *	-0.000864 ***	-0.001104 *	-0.001355 **	-.000654 *	-0.00092 **
$Observations$	39	38	38	38	37	37	36	36	35	35
$Growth\ control$	no	yes	no	yes	No	yes	No	Yes	no	Yes

Panel B: Using d_g_{t+k} as a dependent variable

	$k=0$		$k=1$		$k=2$		$k=3$		$k=4$	
$\Delta agni_t$	0.00042 *	0.00092	0.00121 ***	0.00084 ***	0.00088 ***	0.000655 **	0.00051 *	0.00102	0.00052	0.00055 **
$\beta(\Delta agni_t) - \beta(\Delta aggav_t)$	-0.00069 *	-.000409 **	-0.00104 ***	-0.00111 ***	-0.000894 *	-0.00059 **	-0.000613 ***	-0.00023 ***	-.000505 **	-0.00039 *
$\beta(\Delta agni_t) - \beta(\Delta agnav_t)$	-0.00099 ***	-.000709 *	-0.00103 **	-0.00122 ***	-0.000964 **	-0.00079 **	-0.000603 ***	-0.00033 *	-.000655 **	-0.0005 *
$\Delta agoi_t$	0.00101	0.001358**	0.00144 ***	0.00109 ***	0.00132 ***	0.00119 ***	0.00111 **	0.001125 ***	0.000987 **	0.00095 **

$\beta(\Delta agoi_t) - \beta(\Delta aggav_t)$	-0.0001	-.000029 *	-0.00081 *	-0.00068 *	-0.000454 *	-0.000055 *	-0.000013	-0.000125	-.000038	0.00001
$\beta(\Delta agoi_t) - \beta(\Delta agnav_t)$	-0.0004 *	-.000271 **	-0.0008 **	-0.00097 *	-0.000524 *	-0.000255 *	-0.000003	-0.000225	-.000188	-0.00010
$\Delta agcf_t$	0.00092 *	0.00075	0.00135 ***	0.00099 **	0.00054 **	0.00039 **	0.00039 *	0.00045 *	0.00064 **	0.00029
$\beta(\Delta agcf_t) - \beta(\Delta aggav_t)$	-0.00019 *	-.000579 *	-0.0009 **	-0.00096 ***	-0.001234 ***	-0.000855 **	-0.000733 *	-0.0008 *	-.000385 **	-0.00065 **
$\beta(\Delta agcf_t) - \beta(\Delta agnav_t)$	-0.00049 *	-.000879 **	-0.00089 ***	-0.00107 ***	-0.001304 ***	-0.001055 **	-0.000723 *	-0.0009 **	-.000535 *	-0.00076 **
$Observations$	39	38	38	38	37	37	36	36	35	35
$Growth\ control$	no	yes	no	Yes	No	yes	no	Yes	no	Yes

The table is divided into two panels. Panel A shows the estimates of the coefficients of the aggregate accounting variables (only) of the models 54, 55, 56, 57, 58 and 59, as well as the differences between each estimated coefficient and the estimated coefficients in the models that use gross and net value added. Panel B shows the estimates of the coefficients of the aggregate accounting variables (only) of the models 65, 66, 67, 68, 69 and 70.

$g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \varepsilon_{t+k}$(54)

$g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$ (55)

$g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \varepsilon_{t+k}$ (56)

$g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(57)

$g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \varepsilon_{t+k}$ (58)

$g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(59)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \varepsilon_{t+k}$ (65)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agni_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(66)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \varepsilon_{t+k}$(67)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agop_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(68)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \varepsilon_{t+k}$(69)

$d\_g_{t+k} = \alpha_k + \beta_k \Delta agcf_t + \theta_k \Delta agacc_t + \gamma_k g_{t+k-1} + \varepsilon_{t+k}$(70)

Where: $g_t$represents the growth rate of Brazil's GDP on date t, $\Delta agni_t$the growth rate of aggregate net income on date$t$, $\Delta agop_t$ the growth rate of aggregate operating income on date t, $\Delta agcf_t$ the growth rate of aggregate cash flows on date t, $\Delta agacc_t$ the growth rate of aggregate accruals on date$t$ and d_g_{t+k} the dummy that captures whether the growth rate is above or below the median growth rates. Columns 1, 3, 5, 7 and 9 show the estimates of the coefficients of the models that do not use macroeconomic control regarding the growth rate of the previous date, columns 2, 4, 6, 8 and 10 present the estimates of the coefficients of the models that use the control. The models in panel A are estimated by OLS and the models in the second panel by Probit. Under each coefficient and each difference, asterisks are marked with their respective confidence levels. Coefficients and differences marked with an asterisk (*) are statistically significant considering 10% significance. Coefficients and differences marked with two asterisks (**) are statistically significant considering a 5% significance level. Coefficients and differences marked with three asterisks (***) are statistically significant with 1% significance.

Source: Author's own elaboration

4.5 CONCLUSION

The focus of this research is to verify a possible relation between value added and the economic growth of future GDP. Additionally, I test whether value added information has a stronger impact on future growth when compared to the effects of aggregate earnings on economic activity.

The estimated relation is a consequence of the value added definition. Cunha, Ribeiro and Santos (2005), for example, claim that VAS allows for mapping the wealth distribution to different stakeholders linked to its generation, other than identifying the wealth generated exclusively by the company. VAS metrics are closely linked to a country's GDP, making the statement an appropriate information source to calculate GDP using value added calculated for each sector of the economy (De Luca,1998).

The hypotheses are validated allowing state that aggregate value added (net and gross) are predictive of Brazil's growth rate of up to four quarters ahead. Previous literature on aggregate data and economic forecasting (Konchitchki and Patatoukas, 2014 and Gallo et. al, 2016) explores the effect of aggregate earnings on macroeconomic parameters. This research corroborates the literature verifying that aggregate earnings and value added is predictive of future growth rate.

Thus, it is possible to state that, on average, the real GDP growth in the quarters ahead of the date of the accounting data is more sensitive to changes in the value added of Brazilian firms than the earnings made by them, whether

they are operating income or net income, these results are also valid for cash flows.

Aggregate operating profit is the only metric that, when aggregated for Brazil, showed no statistical difference in long-term growth rate estimates. Thus, as a conclusion, value added, as - reported in VAS - has a greater impact on short-term growth rate estimates compared to the same effect when measured by operating profit. However, for projections that approach one year, there is no difference between the effects.

The research contributions are related to literature and practice. Regarding the literature, it is evident that there is much research yet to explore on value added statements and on aggregate accounting data. However, the results corroborate VAS informativeness relevance (Santos, Botinha and Lemes, 2019; Machado et. al, 2015; Barros et al., 2013 and Stanzani et al., 2016) since value added statement content, when aggregated, is informative of future economic growth in Brazil.

Regarding the practical contribution, the study elucidates the relevance of VAS information for economic purposes, considering this financial statement is not mandatory in most countries. Then, the study points to an absence of VAS elaboration, pertaining to Social Balance, which is highly informative - and more than all others tested - regarding economic parameters capable of redirecting economic policy decisions and public budget preparation.

The research limitations are associated to sample size, which is related to non-mandatory VAS disclosure in most countries. So, data is available only in Brazil in a time series of economic data and aggregate accounting data. Even

though, the findings can evidence that various countries leave out extremely relevant information content from value added statement.

5 FINAL CONSIDERATIONS

The main study objective is to analyze whether aggregate accounting information is predictive of economic growth. In the second chapter, I verify whether aggregate earnings carry information about real GDP growth rate in 78 countries over 18 years. In addition, I analyze whether any accounting metrics, when aggregated, have a more significant impact on economic activity for up to two years ahead. Moreover, looking to accruals and cash flows data and as is believed that the more subjective component has less impact on GDP estimates.

The results for the second chapter show that net profits, operating income, and earnings before extraordinary items, when aggregated, are predictive of economic activity in several countries. This result corroborates to aggregate data studies by Konchitchki and Patatoukas (2014) that show that aggregate earnings (earnings before extraordinary items) are informative of the United States growth rate. In addition to this result, it was evident that among the profit metrics used, operating income has the greatest impact on growth rate. Comparing the impact of accruals and cash flows, the earnings component that interferes with future economic activity is not accruals but cash flows. This result is in accordance to Richardson et al. (2005) theory that affirm that accruals are subjectivity and the fact that some accruals have no association with the firm's production.

In the third chapter, the main objective is to analyze the effect that the adoption of IFRS around the world has on the relation of aggregate accounting data to future economic activity. The expected relation is that, after the

convergence, the association between aggregate earnings and real GDP growth rate would be stronger, since there are indications IFRS adoption tends to generate an improvement in accounting data when analyzed at company level (Ashbaugh and Pincus, 2001; Barth et al., 2008; Landsman et al., 2012; Gao, Jiang and Zang, 2019; Ray, 2018, Levitt, 1998; Christensen et al., 2015).

The findings allow to affirm that, because of IFRS adoption, aggregate earnings informativeness has an increase on growth rate, which can be expected, as information has become more trustworthy to assess companies' reality individually. It is also evident that the difference between the effect of cash flows and aggregate accruals is smaller in countries ruled by IFRS, because it reduces the subjectivity of accruals' component.

In the fourth chapter, the analysis is restricted to Brazil, since this is a country that has obliged to disclose value added statement. It is intended to analyze whether value added statement metrics (specifically gross and net added value) are informative about Brazilian growth rate over several quarters. Also, I aim to verify if these metrics stand out in relation to other metrics, such as earnings and cash flows, since VAS numbers are more closely linked to GDP definition. According to De Luca (1998), it is possible to use value added statements to calculate gross domestic product based on the measurement of value added in different sectors.

The findings in the fourth chapter show that, as well as earnings and cash flows, value added, net and gross, is predictive of growth rate in Brazil, which corroborate to VAS informational content literature (Santos, Botinha and Lemes, 2019; Machado et. al, 2015; Barros et al., 2013 and Stanzani et al.,

2016). As expected, value added has a greater impact on GDP growth rate than any other metric used in the study. However, it is evident that for 1-year estimates there is no difference between the impact of value added and operating income on growth rate. This result is consistent, since aggregate operating income has the greatest impact on economic activity, when analyzing 78 countries for a period ranging 18 years.

When analyzing results all together, my main conclusions are that the theory raised by Konchitchki and Patatoukas (2014) on aggregate accounting information ability to predict economic activity expands, going beyond the American market and becoming real for various countries. Thus, using aggregate accounting metrics can help make more accurate forecasts of the economic growth rate when analyzing diverse countries. Particularly, operating income has shown be more informative about economic growth rate.

It should also be noted that the economic forecast is more assertive, and aggregate components are more relevant when a country is under IFRS rules, since it improves accounting information quality. Even more important is, when a country imposes VAS disclosure, generated wealth metrics, as found in this statement, prove to be more informative on growth rate than any other aggregate accounting variable.

My contributions to the literature are regarding the redirection on how to forecast economic activity. The fact that macroeconomic analysts do not incorporate relevant metrics in their aggregate forecasts drives an increase in forecast errors (Konchitchki and Patatoukas, 2014; Gallo et al., 2016). So, the study clarifies the relevance of aggregate accounting data and how it can

predict GDP growth in several countries other than the United States. Moreover, it is possible to separate countries where these relations are stronger, as countries which, at some point, adhered to IFRS. Lastly, my main contribution is, that among all accounting metrics used to make economic forecasts, the most relevant are those from VAS, which becomes a singling of value added statement disclosure relevance. Around the world, only a few countries made VAS mandatory, which leads most global companies to not produce this statement, even considering its informativeness.

Assertive forecasting on economic activity data is extremely relevant for preparing federal budget and for making decisions over economic policies. So, aggregate accounting data should be incorporated into forecasting models from value added statement data.

Future literature should explore economic forecasting using aggregate accounting data. However, this study clarifies that accounting information is an important predictor of future GDP, especially in countries under IFRS, and that various countries do not mandate an extremely informative financial statement about future economic information.

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7. APPENDIX

TABLE 17: DESCRIPTIVE STATISTICS BY COUNTRY

		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Argentina	Obs/year	68,94	69,94	68,94	69,94	68,94	69,94	69,94
	Mean	0.0229	0.0943	0.629	0.657	-0.261	0.0890	0.333
	Sd	0.0557	0.338	2.580	2.025	1.549	0.841	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Austrália	Obs/year	1586,89	1586,89	1586,89	1586,89	1586,89	1586,89	1586,89
	Mean	0.0280	0.168	0.150	0.153	0.171	0.180	0.500
	Sd	0.00688	0.522	0.447	0.464	0.414	0.594	0.514
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Áustria	Obs/year	76,72	76,72	76,72	76,72	76,72	76,72	76,72
	Mean	0.0156	0.109	-0.334	-1.452	0.0823	0.174	0.889
	Sd	0.0170	0.547	2.687	3.032	0.667	1.086	0.323
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Bahrain	Obs/year	14,06	14,06	14,06	14,06	14,06	14,06	14,06
	Mean	0.0455	0.0559	0.119	0.116	0.0777	-0.00659	1
	Sd	0.0173	0.265	0.371	0.373	0.284	1.290	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Bangladesh	Obs/year	97,94	97,94	97,94	97,94	97,94	97,94	97,94
	Mean	0.0573	0.246	0.306	0.213	-0.128	-1.427	.
	Sd	0.00678	0.422	0.389	0.326	1.586	4.340	.
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Belgium	Obs/year	109,5	109,5	109,5	109,5	109,5	109,5	109,5
	Mean	0.0153	-0.542	-0.204	1.072	0.157	0.134	0.722
	Sd	0.0140	1.353	6.643	4.179	0.673	1.027	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Bermuda	Obs/year	37,16	37,16	37,16	37,16	37,16	37,16	37,16

	Mean	0.00352	-0.167	0.727	0.936	-1.611	1.518	0.500
	sd	0.0346	1.938	2.518	3.442	3.271	4.064	0.514
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	310,89	310,89	310,89	310,89	310,89	310,89	310,89
Brazil	mean	0.0230	-0.0133	1.841	0.587	1.835	0.299	0.444
	sd	0.0292	0.229	6.097	1.643	7.633	1.434	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
British	Obs/year	35	35	35	35	35	35	35
Virgin	mean	0.00506	0.482	0.551	1.027	0.0643	1.603	0.778
Islands	sd	0.0495	1.880	3.420	4.771	2.619	6.034	0.428
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	35,33	35,33	35,33	35,33	35,33	35,33	35,33
Bulgária	mean	0.0351	0.252	1.817	0.331	0.358	-1.418	0.778
	sd	0.0279	0.717	6.647	0.863	1.168	3.712	0.428
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	23,3	23,3	23,3	23,3	23,3	23,3	23,3
Cayman Islands	mean	0.0130	0.299	1.015	0.225	-1.914	-3.468	0.500
	sd	0.0170	0.547	2.687	3.032	0.667	1.086	0.323
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	155,89	155,89	155,89	155,89	155,89	155,89	155,89
Chile	mean	0.0744	0.0670	0.102	0.0999	0.0724	-1.840	0
	sd	0.0235	0.188	0.378	0.365	0.419	7.299	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	2662,11	2662,11	2662,11	2662,11	2662,11	2662,11	2662,11
China	mean	0.0365	-0.0930	1.519	-1.122	-0.292	0.836	0.500
	sd	0.0274	1.136	6.656	2.922	3.617	4.452	0.514
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	30,83	30,83	30,83	30,83	30,83	30,83	30,83
Colombia	mean	0.0375	0.134	0.189	0.945	1.531	6.819	0.167
	sd	0.0158	0.352	0.452	3.728	5.495	23.96	0.383
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Croatia	Obs/year	128,6	128,6	128,6	128,6	128,6	128,6	128,6

	mean	0.0181	-0.119	-0.239	-0.303	1.127	0.743	0.556
	sd	0.0338	1.301	1.703	1.877	3.409	1.456	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Cyprus	Obs/year	50,06	50,06	50,06	50,06	50,06	50,06	50,06
	mean	0.0209	-0.343	0.267	0.486	-1.077	-1.354	1
	sd	0.0328	2.259	1.952	4.240	3.962	3.575	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Chez Republic	Obs/year	213,1	213,1	213,1	213,1	213,1	213,1	213,1
	mean	0.0272	0.0690	0.267	-0.279	0.266	-0.924	0.778
	sd	0.0278	0.393	0.791	1.799	1.943	1.688	0.428
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
CC4te D'Ivoire		18	18	18	18	18	18	18
	mean	0.0322	0.198	0.173	0.353	-1.262	-1.117	0.765
	sd	0.0411	0.426	0.681	1.062	3.573	1.850	0.437
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Denmark	Obs/year	137,67	137,67	137,67	137,67	137,67	137,67	137,67
	mean	0.0122	-0.551	-1.687	-0.630	-0.461	1.040	0.722
	sd	0.0196	2.309	3.722	5.534	2.436	4.036	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Egypt	Obs/year	89,22	89,22	89,22	89,22	89,22	89,22	89,22
	mean	0.0407	0.208	0.279	0.257	0.265	0.461	0.389
	sd	0.0149	0.489	0.580	0.679	0.625	2.570	0.502
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Estonia	Obs/year	16	16	16	16	16	16	16
	mean	0.0397	0.121	0.0474	-0.00958	2.298	2.358	1
	sd	0.0478	0.492	0.799	0.759	7.607	12.89	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Finland	Obs/year	139,1	139,1	139,1	139,1	139,1	139,1	139,1
	mean	0.0149	-0.102	1.837	-0.756	0.0273	0.108	0.722
	sd	0.0312	0.967	7.956	3.367	0.239	0.547	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
France	Obs/year	672,8	672,8	672,8	672,8	672,8	672,8	672,8

	mean	0.0135	-0.558	-0.573	-0.691	0.0629	0.224	0.722
	sd	0.0141	1.461	2.180	1.842	1.084	1.188	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	351,2	351,2	351,2	351,2	351,2	351,2	351,2
Germany	mean	0.0134	-1.346	1.050	1.188	-0.109	0.198	0.722
	sd	0.0224	2.042	5.842	3.917	0.948	1.103	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	195,3	195,3	195,3	195,3	195,3	195,3	195,3
Greece	mean	0.00122	0.214	-0.258	-0.329	1.082	1.947	0.722
	sd	0.0446	1.428	1.823	1.591	2.884	5.203	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	21,7	21,7	21,7	21,7	21,7	21,7	21,7
Hungary	mean	0.0217	0.00122	-0.528	-0.577	0.110	0.257	0.889
	sd	0.0289	0.283	2.599	2.357	0.420	0.699	0.323
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	14,4	14,4	14,4	14,4	14,4	14,4	14,4
Iceland	mean	0.0297	0.143	-0.644	2.858	1.158	3.112	0.722
	sd	0.0380	0.447	3.890	6.198	8.683	20.51	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	2929	2929	2929	2929	2929	2929	2929
India	mean	0.0619	0.0212	-0.185	-0.102	0.178	-0.518	0.0556
	sd	0.0155	0.140	0.974	1.446	0.641	1.881	0.236
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	41,12	41,12	41,12	41,12	41,12	41,12	41,12
Indonesia	mean	0.0501	0.0397	-0.861	-0.158	7.546	15.52	0
	sd	0.00647	0.214	2.695	1.082	13.64	30.19	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	64,7	64,7	64,7	64,7	64,7	64,7	64,7
Ireland	mean	0.0416	0.0904	0.696	0.633	2.785	0.445	0.667
	sd	0.0427	2.823	1.735	1.896	9.463	1.673	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Israel	Obs/year	272,4	272,4	272,4	272,4	272,4	272,4	272,4

	mean	0.0352	0.658	-0.620	0.465	-1.062	-0.888	0.611
	sd	0.0211	2.246	3.160	1.279	3.403	2.232	0.502
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	262,9	262,9	262,9	262,9	262,9	262,9	262,9
Italy	mean	0.00336	0.0487	0.321	-1.010	0.714	1.031	0.722
	sd	0.0213	0.355	2.261	2.720	2.145	3.047	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	20,1	20,1	20,1	20,1	20,1	20,1	20,1
Jamaica	mean	0.00625	0.0654	0.152	0.0946	0.227	-0.182	0.833
	sd	0.0174	0.183	0.412	0.222	0.537	2.843	0.383
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	3103,55	3103,55	3103,55	3103,55	3103,55	3103,55	3103,55
Japan	mean	0.00911	0.0433	-0.806	-0.759	0.0585	0.0127	0
	sd	0.0201	0.207	2.706	2.517	0.132	0.311	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	98,39	98,39	98,39	98,39	98,39	98,39	98,39
Jordan	mean	0.0442	-0.0654	1.589	1.950	0.457	0.970	0.444
	sd	0.0218	2.126	6.648	5.477	1.277	2.889	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	15,3	15,3	15,3	15,3	15,3	15,3	15,3
Kazakhstan	mean	0.0630	0.470	1.845	-0.561	-0.104	-0.557	0.778
	sd	0.0330	1.536	6.404	2.721	1.861	3.077	0.428
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	27,72	27,72	27,72	27,72	27,72	27,72	27,72
Kenya	mean	0.0436	0.402	0.346	0.325	0.583	2.140	1
	sd	0.0212	1.546	1.318	1.323	1.764	7.179	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	74,39	74,39	74,39	74,39	74,39	74,39	74,39
Kuwait	mean	0.0337	0.266	0.107	0.104	0.589	-0.344	1
	sd	0.0515	0.556	0.915	0.940	1.410	1.852	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Latvia	Obs/year	26,05	26,05	26,05	26,05	26,05	26,05	26,05

	mean	0.0389	0.282	-0.427	-0.0307	-0.0762	0.625	0.667
	sd	0.0509	1.480	2.393	3.864	2.155	1.435	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	30	30	30	30	30	30	30
Lithuania	mean	0.0422	0.622	-0.912	-0.159	2.088	0.702	0.889
	sd	0.0400	1.608	3.505	2.604	6.694	1.791	0.323
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
		30,1	30,1	30,1	30,1	30,1	30,1	30,1
Luxembourg	mean	0.0282	0.503	0.606	0.750	-0.421	4.667	0.722
	sd	0.0291	1.637	6.753	4.045	2.357	18.61	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	10,1	10,1	10,1	10,1	10,1	10,1	10,1
Malaysia	mean	0.0482	0.0602	0.984	0.414	0.0662	0.0770	0.444
	sd	0.0218	0.348	2.906	1.730	0.346	0.517	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	10	10	10	10	10	10	10
Malta	mean	0.0344	0.0124	0.863	0.0259	0.320	0.511	1
	sd	0.0272	1.023	6.637	1.240	1.893	2.174	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Mauritius	mean	0.0397	0.148	0.226	0.173	0.636	-1.011	0.944
	sd	0.0137	0.363	0.573	0.430	1.875	4.806	0.236
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	104,89	104,89	104,89	104,89	104,89	104,89	104,89
Mexico	mean	0.0210	-0.00355	0.312	0.135	0.0849	0.154	0.444
	sd	0.0243	0.112	1.371	0.656	0.458	0.637	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	12,8	12,8	12,8	12,8	12,8	12,8	12,8
Morocco	mean	0.0459	0.0445	0.140	0.0362	0.456	3.218	0
	sd	0.0184	0.106	0.285	0.155	0.906	24.16	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Netherlands	Obs/year	149,6	149,6	149,6	149,6	149,6	149,6	149,6

	mean	0.0277	0.658	1.784	0.191	-0.965	0.253	0.500
	sd	0.0145	2.470	6.084	1.097	1.311	0.752	0.514
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	135,6	135,6	135,6	135,6	135,6	135,6	135,6
New Zeland	mean	0.0397	0.148	0.226	0.173	0.636	-1.011	0.944
	sd	0.0137	0.363	0.573	0.430	1.875	4.806	0.236
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	72,7	72,7	72,7	72,7	72,7	72,7	72,7
Nigeria	mean	0.0554	0.0967	-0.308	-0.206	0.777	1.352	0.333
	sd	0.0318	0.342	1.625	0.949	2.498	7.457	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	207,3	207,3	207,3	207,3	207,3	207,3	207,3
Norway	mean	0.0168	0.279	0.451	0.248	-1.399	-0.0395	0.722
	sd	0.0125	1.110	1.448	1.091	3.615	1.205	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	60,9	60,9	60,9	60,9	60,9	60,9	60,9
Oman	mean	0.0335	-0.212	-0.0839	0.543	0.311	0.296	1
	sd	0.0301	1.371	1.103	2.551	1.070	2.876	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	272,1	272,1	272,1	272,1	272,1	272,1	272,1
Pakistan	mean	0.0411	0.0217	0.138	0.130	-0.470	-2.001	0.444
	sd	0.0164	0.167	0.465	0.461	3.375	5.126	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	85,3	85,3	85,3	85,3	85,3	85,3	85,3
Peru	mean	0.0467	0.0620	0.238	0.341	0.123	0.247	0.444
	sd	0.0232	0.287	0.700	1.185	0.393	0.801	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	168,9	168,9	168,9	168,9	168,9	168,9	168,9
Philippines	mean	0.0501	0.140	0.270	-0.556	-0.193	-0.00879	0.500
	sd	0.0158	0.737	2.182	2.529	5.218	1.276	0.514
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Poland	Obs/year	466	466	466	466	466	466	466

	mean	0.0357	0.845	-0.343	-0.509	0.464	-2.141	0.889
	sd	0.0148	2.348	2.301	2.905	1.492	7.033	0.323
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	51,8	51,8	51,8	51,8	51,8	51,8	51,8
Portugal	mean	0.00250	0.0230	-1.716	-0.238	-0.597	4.557	0.722
	sd	0.0213	0.397	2.180	4.301	3.044	18.61	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	16,2	16,2	16,2	16,2	16,2	16,2	16,2
Qatar	mean	0.0741	0.0525	0.131	0.135	0.213	1.966	1
	sd	0.0421	0.419	0.441	0.456	0.687	20.47	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	29,2	29,2	29,2	29,2	29,2	29,2	29,2
Republicof Korea	mean	0.0393	0.0931	-0.238	0.0295	1.847	0.192	0.389
	sd	0.0182	0.219	6.098	4.560	7.574	0.504	0.502
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	93,8	93,8	93,8	93,8	93,8	93,8	93,8
Romania	mean	0.0369	0.537	-0.980	-1.223	-0.579	-2.549	0.222
	sd	0.0362	1.833	2.394	3.075	3.295	8.539	0.428
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	199,1	199,1	199,1	199,1	199,1	199,1	199,1
Russianfederetion	mean	0.0350	0.0645	-0.0119	0.196	0.633	1.428	0.333
	sd	0.0426	0.239	2.169	0.598	1.391	6.315	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	94,5	94,5	94,5	94,5	94,5	94,5	94,5
Saudi Arabia	mean	0.0346	0.203	0.161	0.136	-0.720	1.409	0.0556
	sd	0.0365	0.549	0.430	0.301	3.023	4.993	0.236
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	552,9	552,9	552,9	552,9	552,9	552,9	552,9
Singapore	mean	0.0489	0.307	-0.734	0.507	-0.0866	-0.412	0.444
	sd	0.0349	1.902	2.669	2.698	0.862	1.769	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Slovenia	Obs/year	24,6	24,6	24,6	24,6	24,6	24,6	24,6

	mean	0.0215	0.0230	0.126	-0.674	2.625	4.549	0.722
	sd	0.0344	0.189	1.648	2.239	7.704	18.89	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	25,4	25,4	25,4	25,4	25,4	25,4	25,4
South Africa	mean	0.0278	-0.0105	0.0148	-0.000609	0.116	-1.267	0.722
	sd	0.0174	0.142	0.358	0.316	0.346	7.443	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	138,11	138,11	138,11	138,11	138,11	138,11	138,11
Spain	mean	0.0175	-0.0165	-0.0848	-0.627	0.562	0.733	0.722
	sd	0.0259	0.193	3.070	2.664	1.899	1.928	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	11,5	11,5	11,5	11,5	11,5	11,5	11,5
Sirilnka	mean	0.0506	0.124	0.181	0.165	0.633	-2.099	0.333
	sd	0.0223	0.348	0.484	0.460	1.487	7.120	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	533,2	533,2	533,2	533,2	533,2	533,2	533,2
Sweden	mean	0.0221	0.137	0.514	0.130	0.0943	0.287	0.722
	sd	0.0251	0.320	1.046	0.342	1.700	0.947	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	12,2	12,2	12,2	12,2	12,2	12,2	12,2
Switzerland	mean	0.0183	-0.172	1.014	-1.052	0.105	0.228	0.944
	sd	0.0154	1.653	7.234	2.904	0.373	0.914	0.236
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	1434,8	1434,8	1434,8	1434,8	1434,8	1434,8	1434,8
Taiwan	mean	0.0347	0.317	0.410	0.425	0.296	3.961	0.278
	sd	0.0286	1.062	1.171	1.175	0.898	15.30	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	469,4	469,4	469,4	469,4	469,4	469,4	469,4
Thailand	mean	0.0383	0.0816	1.503	0.0151	0.0921	1.367	0.389
	sd	0.0221	0.212	6.053	0.794	0.232	5.491	0.502
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Trinidad and	Obs/year	10,1	10,1	10,1	10,1	10,1	10,1	10,1

Tobago	mean	0.0312	0.208	0.248	0.244	-0.234	3.909	1
	sd	0.0507	0.474	0.693	0.667	3.853	20.89	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	31,1	31,1	31,1	31,1	31,1	31,1	31,1
Tunisia	mean	0.0317	0.143	0.331	0.203	0.633	-1.465	0
	sd	0.0199	0.432	0.827	0.874	1.259	10.24	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	230,11	230,11	230,11	230,11	230,11	230,11	230,11
Turkey	mean	0.0481	0.0681	1.828	-0.233	2.841	5.125	0.444
	sd	0.0436	0.211	6.044	1.817	7.814	18.81	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	16,2	16,2	16,2	16,2	16,2	16,2	16,2
Ukraine	Mean	0.0247	-0.200	2.403	1.380	-1.297	-2.063	0.444
	Sd	0.0570	1.644	9.565	4.845	3.229	14.65	0.511
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	18,4	18,4	18,4	18,4	18,4	18,4	18,4
United Arab Emirates	Mean	0.0420	0.197	0.210	0.209	1.820	-1.173	1
	Sd	0.0374	0.520	0.512	0.616	6.689	6.464	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	101,2	101,2	101,2	101,2	101,2	101,2	101,2
United Kingdom	Mean	0.0181	0.129	0.0637	0.0638	1.941	-0.531	0.667
	Sd	0.0178	0.500	0.366	0.340	7.029	5.558	0.485
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	12,94	12,94	12,94	12,94	12,94	12,94	12,94
Venezuela	Mean	0.00680	0.0184	-0.639	-0.473	1.522	4.141	0.278
	Sd	0.0702	0.944	2.913	1.699	7.796	18.90	0.461
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	259,94	259,94	259,94	259,94	259,94	259,94	259,94
Vietnan	mean	0.0608	0.852	1.979	1.447	0.867	-0.0897	0
	sd	0.00686	1.769	6.572	4.059	2.395	8.476	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
Zambia	Obs/year	23,39	23,39	23,39	23,39	23,39	23,39	23,39

	mean	0.0580	-0.242	0.787	1.327	1.452	1.632	1
	sd	0.0188	1.382	2.114	4.696	7.756	19.64	0
		g_{it}	$\Delta agpi_{it}$	$\Delta agni_{it}$	$\Delta agebei_{it}$	$\Delta agcf_{it}$	$\Delta agacc_{it}$	$ifrs$
	Obs/year	11.22	11.22	11.22	11.22	11.22	11.22	11.22
Zimbabwe	mean	0.0102	0.714	1.320	0.756	4.199	3.363	1
	sd	0.0722	2.001	4.596	4.771	11.15	21.13	0

The table shows average and standard deviation of the main study variables, in addition to the average number of companies per year aggregated in each countryg_{it} represents the GDP growth rate of country i on date t,$\Delta agni_{it}$, the growth rate of aggregate net income of country i on date t, $\Delta agoi_{it}$ the growth rate of aggregate operating income household in country i on date t, $\Delta agebei_{it}$ the growth rate of aggregate earnings before extraordinary items in country i on date t, $\Delta agcf_{it}$a growth rate of aggregate cash flows of country i on date t according to Sloan (1996) and $\Delta agacc_{it}$ the growth rate of aggregate accruals of country i on date t according to Sloan (1996) and IFRS is a dummy that assumes a value of 1 if on the date in question the country was under IFRS.

Source: Author's own elaboration