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FAC009 Brazilian private pension funds: a call for improved governance

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ABSTRACT:
As of 2014, Brazilian private pension funds (PPFs) present the fourth highest relationship between their assets and country's GDP, among the world's ten largest economies. The inherent conflict of interest between participants, sponsors, and managers might add to possible economic difficulties to be faced by Brazilian PFFs. Governance systems could enhance PPFs' ability to mitigate such potential conflicts of interest. Within this context, a governance scoring index was constructed for private pension funds, based on 34 indicators. The adherence of 110 Brazilian private pension funds to the governance practices were subsequently measured using this index in 2013, and determinants that explained cross sectional variance were studied. The results indicate that PPFs' behaviour depends largely on the public or private nature of the sponsoring entity. Privately sponsored PPFs with larger amounts of assets and level reliance on third-party services presented a higher score of governance.

Key-words: Governance. Private Pension Funds. Determinants

1. INTRODUCTION

Brazilian Private Pension Funds (PPFs) are important for their supplementary role on citizen's social security. PPFs are expected to be long-term oriented, and display a latent potential for conflicts of interest between these funds' management and participants. There is a multitude of challenges faced by Brazilian PPFs' managers, as well as various sources of risks born by participants. In this context, we analysed the sensibility of PPFs governance practices to explanatory factors suggested by the extant literature, which should improve value delivered by managers to participants.

Global life expectancy at birth rose to 70 years from 67 years, between the 2000-2005 and 2010-2015 five-year periods. Forecasts by the UN indicate that this expectancy will grow further, reaching 77 years in the 2045-2050 five-year period (United Nations, Department of Economic and Social Affairs, 2015). Consequently, retired participants of Private Pension Funds (PPFs) will expect to receive benefits from their individual pension accounts for a much longer period of time. This increased life expectation is confronted by an economic scenario of reduced economic growth rates, corporate profits, and interest rates. The conjunction of these demographic and economic factors may impair a PPF's ability to provide for its retired participants (Organisation for Economic Co-operation and Development. 2015).

Challenges faced by the Brazilian PPFs are even more complex. Between 1993 and 2013 the Brazilian population aged 65 or above increased by 70%. This increase was the second highest among the ten largest economies in the world (World Bank, 2016). Estimates of the Brazilian population over 65 show that this demographic will rise to 26.8% of the total population by 2060, from 7.4% in 2013, meaning one out of every four Brazilians will be in retirement (IBGE - Instituto Brasileiro de Geografia e Estatística, 2013).

In connection with the demographic challenges implied above, the economic environment presents additional bad news for the Brazilian PPFs. The ratio of PPFs' total assets to the country's GDP has reduced to 12% (2014) from 13% (2013) (Organisation for Economic Co-operation and Development. 2015). The International Monetary Fund (2016) forecasts contraction of the Brazilian Economy in 2016 (-3.8% growth) and zero growth in 2017. This outlook is even more negative when considering the negative (-3.5%) growth presented by the Brazilian economy in 2015, as measured by the IBGE (Instituto Brasileiro de Geografia e Estatística, 2016).

Conflicts of interest between fund management and PPFs' participants could escalate the level of challenges faced by the funds. It is likely that unethical behaviour of fund managers was responsible for the recent multi-billion-dollar deficits presented by Petros and Postalis, respectively the pension funds of the employees of Petrobras and of the Brazilian Post Office. In Postalis' case, former managers were convicted by the pension funds regulatory agency, the Superintendência Nacional de Previdência Complementar – PREVIC (National Superintendence of Pension Funds), due to irregular investments and sales of real state between 2010 and 2012 (Ministério da Previdência Social – MPS, 2015). These former managers were prohibited to act as fund managers for a ten-year period.

Conflicts of interest are one of the main assumptions considered by Jensen and Meckling (1976) in their definition of agency problems. When principals (sponsors, working and retired participants) and agents (PPF's management) are both utility maximizers, it is probable that the

agent will not act in the principal's best interest. The agent could have personal interests that are prioritized in relation to the agents' objectives. Consequently, agents' decisions are either directly self-beneficial or implicate on exerting minimum effort to extract maximum benefits (Jensen & Meckling, 1976). Thus, the misalignment of incentives of principals and agents results in conflicts of interest.

The separation of ownership and control in pension funds makes these institutions prone to give rise to conflicts of interest, which could theoretically result in lower returns, higher operating costs and higher risks associated with managers' unethical behaviour, including incompetent management, fraud and embezzlement. Hence, governance mechanisms, as system of rules that constrain management behaviour, should be implemented in order to mitigate potential conflicts of interest (Benson, Hutchinson & Sriram, 2011)

In Brazil, efforts to improve the governance of PPFs have increased since the issuance of acts by the Conselho de Gestão da Previdência Complementar – CGPC (Governance Council of Private Social Security), namely the Resolution 13 of 2004 and Resolution 23 of 2006). In 2012, PREVIC published a Best Practices Manual regarding the governance of PPFs.

On a theoretical basis, Brazilian PPFs should adhere fully to requirements set forth by the acts promulgated by the CGPC. They should also be interested on voluntarily observing PREVIC's recommended Governance Best Practices. Through these actions, a PPF should achieve better governance and improve value delivered to its participants. Torres and Santos' (2008) study suggests that governance mechanisms implemented by Brazilian PPFs had a positive effect on returns delivered, with emphasis on the positive association between increased transparency and fund returns. In spite of the expected benefits due to improved governance, Lopes, Kataoka, Ribeiro Filho and Pederneiras' (2010) research found that 26.10% of the Brazilian PPFs do not disclose annual reports as required by the applicable legislation, 58.7% do not present a Governance section on their website, 76% do not disclose reports on investment risks, and only four funds disclose the semi-annual report issued by their fiscal councils.

The study of PPFs specific characteristics could provide some insight into why some PPFs display more governance-oriented behaviour and why some funds do not comply with minimum disclosure requirements. Some of these specific characteristics have already been studied by authors such as Ammann and Zingg (2008), whom studied Swiss pension funds, finding a meaningful and positive relation between the funds' amount of total assets and their level of adherence to governance's best practices. In a study of Australian PPFs, Tan and Cam (2013) found a negative relation between the funds' total expenses and their level of voluntary disclosure of governance practices, but no significant relation between this level and the amount of total assets. Lima (2014) reports a positive correlation between greater voluntary adherence to governance mechanisms and the size of assets and the age of the Brazilian PPFs. Nonetheless, none of the empirical studies reviewed in this paper analysed possible explanatory factors regarding the extension of Brazilian PPFs governance practices, taking the level of adherence to mechanisms recommended by the applicable legislation and by PREVIC as a measure of governance.

Our results suggest that the extent of governance practices adopted by Brazilian PPFs is dependent on the nature of their sponsoring entities. When the sponsoring entity is a privately owned company (publicly traded or not), factors such as size and percentage of invested funds

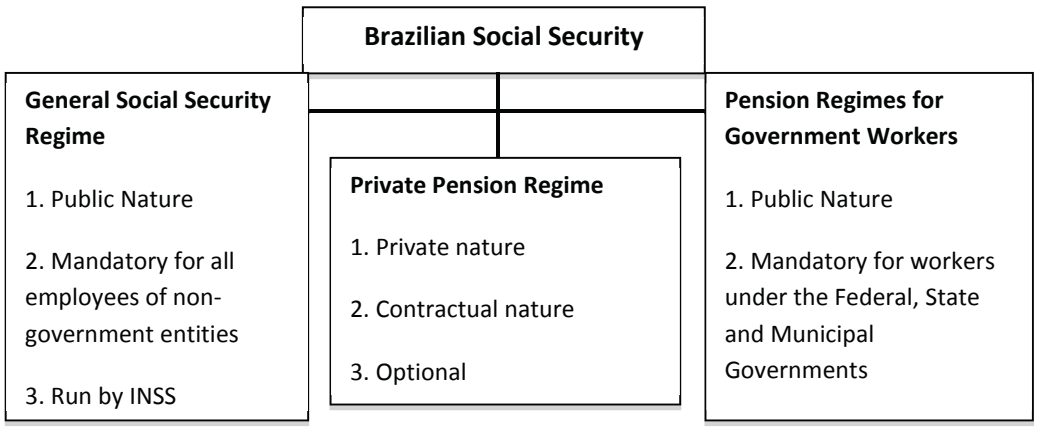
from total assets positively influence the extent of governance practices, whereas the level of expenses that are outsourced to third parties have the opposite effect. However, when the PPF is sponsored by a government-owned entity, only the variable asset size is statistically significant, with a positive signal. In addition, our results show that PPFs sponsored by entities controlled by the Brazilian Federal Government have a greater extent of governance practices, when compared to their counterparts that are sponsored by entities controlled by State Governments.

The remainder of the article is presented as follows. First, an overview of the Brazilian pensions system is presented, followed by a description of the complementary private pension regime. Next, a discussion is presented regarding some of the conflicts of interest that may exist in Brazilian pension funds, along with the corresponding governance mechanisms designed to mitigate such conflicts. Section 5 presents the development of the hypotheses tested, complemented by research design explained in Section 6. Finally, results are presented and discussed in Section 7, followed by concluding remarks in Section 8.

2. OVERVIEW OF THE BRAZILIAN PENSION SYSTEM

The Brazilian Pension system is organized in three main regimes, (a) the public and mandatory, pay-as-you-go (PAYG) system known as General Social Security Regime (RGPS); (b) the Pension Regimes for Government Workers (RPPS); and (c) the Private Pension Regime (RPC) (Ministério da Previdência Social – MPS, 2008a). Figure 1 shows this structure in further detail.

Figure 1 – Brazilian Pension System's structure



Source: (Ministério da Previdência Social – MPS, 2008b)

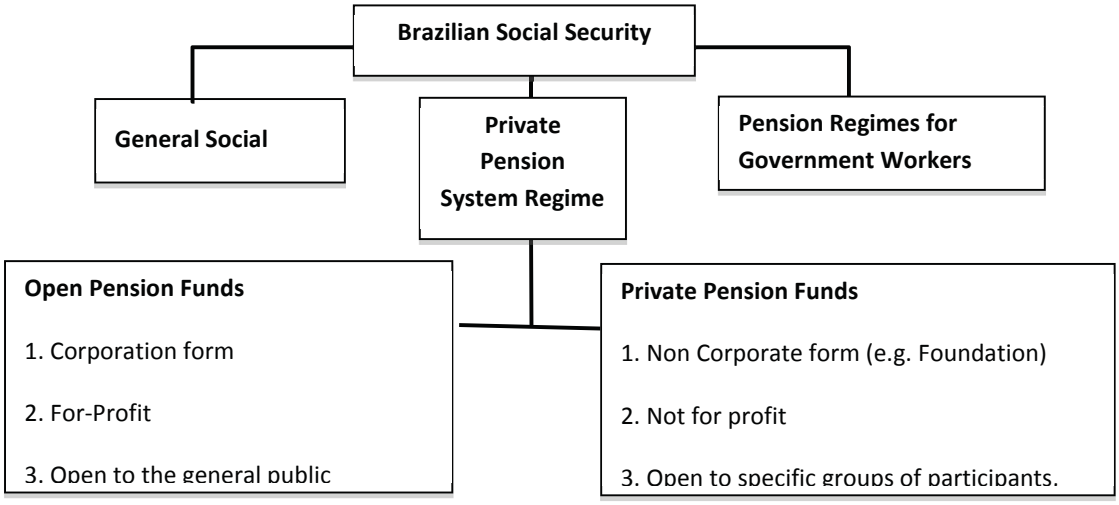
The Private Pension Regime is run by various entities, whose main objective is to create and manage pension funds. This regime is of private nature, being autonomous and complementary to the mandatory regimes mentioned earlier. It works through the accumulation of funds to be invested in order to provide adequate funding for future benefits (Domeneghetti,

2009). In the next section, we present the structure of the Private Pension Regime, emphasizing Private Pension Funds not available to the general public.

3. BRAZILIAN PRIVATE PENSION REGIME

The Brazilian Private Pension Regime is divided in two segments, Open Pension Funds and Private Pension Funds, as presented in Figure 2.

Figure 2 – Brazilian Private Pension Regime's structure



Source: Ministério da Previdência Social – MPS (2008)

While Open Pension Funds (OPFs) are for-profit corporations open to the general public, PPFs are organized in the form of foundations or non-profit organizations, and are not open to the general public. PPFs main objective is to manage collective pension plans of participants. Only employees of the sponsoring entity or members of a specific professional category can be participants of a PPF.

PPFs activities are monitored and supervised by PREVIC, which is a local authority with administrative and financial autonomy, which falls under the responsibility of the Ministry of Social Security of Brazil. PREVIC was created by Law 12,154, of December 23, 2009 (Brazil, 2009) (Corrar, 2013).

The funding of the PPFs benefit plans is a collective responsibility of the private and public organizations that sponsor the PPFs and of the PPFs. The PPFs own legal entities do not participate in this funding, being only responsible for the management of financial resources, resulting in the payment of the benefits expected by the participants (PREVIC, 2012).

Pension Funds are governed by the Federal Complementary Laws 108 (Brazil, 2001) and 109 (Brasil, 2001), both issued on 29 May 2001. Complementary Law 108 regulates the relations between the Union, the State and the municipalities, including their agencies, foundations and other companies, as sponsors of private pension funds, and these sponsored pension funds. These PPFs are categorized as PPFs sponsored by the public sector. Federal

Complementary Law 109 regulates private pension funds sponsored by private entities. This law states that the PPFs can offer common plans, when their plans are made available to their whole universe of participants, or they can offer multiple plans, which is the case when PPFs manage specific plans for different groups of participants, and there is equity independence among plans.

According to the Federal Complementary Laws 108 and 109, PPFs must maintain a minimum governance structure, composed of an Advisory Board, an Audit Board and an Executive Board. The Advisory Board is the highest level of the PPFs' organizational structure, being responsible for defining general policies of the entities' management and of their benefit plans. The Audit Board is the internal control body of the entity, being responsible for supervising the management of pension funds. The executive board is the body responsible for direct management of the entity and shall comply with the guidelines and policies established by the Advisory Board (PREVIC, 2012).

For publicly sponsored PPFs, the Advisory Board shall consist of a maximum of six people, with equal representation among members elected by the participants and sponsors. The Audit Board shall be formed by a maximum of four members, again with parity in the composition of representatives of participants and sponsors. The Executive Board has at most six members. The detailed composition of this body must be provided in the PPF's bylaws. Members of the boards under discussion must have experience in financial, administrative, accounting, legal, supervisory or auditing jobs, and a higher education degree in order to serve on the executive board.

In privately sponsored PPFs, at least one third of the positions on the Advisory Board and the Audit Board must have been elected by the participants. There is no cap on the boards' maximum number of members. Members are required to have experience in financial, administrative, accounting, legal, supervisory or audit activities. For executive management positions, there is no statutory maximum number of directors.

When the regulations imposed on publicly sponsored and privately sponsored private pension funds are compared, it is clear that publicly sponsored PPFs are subject to stricter rules of governance, mostly when it comes to the composition of their governance bodies. For instance, participants of publicly sponsored PPFs elect half of the members of the funds Advisory and Audit Boards, while participants of privately sponsored PPFs can elect a lower minimum number of members, as the Federal Complementary Law 109 states that only one third of the members of these governing bodies must be elected by participants, being the remainder members of the funds governing boards appointed by sponsoring entities.

Next, consideration is provided on the possible conflicts of interests arising from the relationship between participants, sponsors and managers of PPFs, along with a brief discussion of the governance mechanisms available for these entities in Brazil due to applicable legislation and recommendations of PREVIC.

4. CONFLICTS OF INTEREST AND GOVERNANCE MECHANISMS OF THE BRAZILIAN PPFs

Studies on agency theory focus on formal and informal contracts in which one or more persons (the principals) command another person (the agent) to perform some activity on the

formers' behalf, with the delegation of some decision-making authority to the agent (Jensen & Meckling, 1976). The established delegation of authority, from the principal to the agent, can give rise to conflicts of interest. Considering Agency Theory's main assumptions, the conflicts of interest can, in the case of private pension funds, become even more complex than those existing in corporations, due to the increased number of principals and agents involved in the PPFs activities. There are contractual relationships between active and retired participants, sponsors and managers of the pension fund.

The sum of the PPFs' assets originates from funds resulting from contributions made by participants and sponsors. Mismanagement of these assets may lead to actuarial deficits. In such a case, sponsors and participants would have to make additional contributions of financial resources in order to ensure the payment of pensions to current and future assisted persons (Besley and Prat, 2003; Drew and Stanford, 2003; Blecher, 2004).

The management of a PPF's portfolio of investments can result in relevant conflicts of interest. The sponsor could for example take advantage of its position, and, by appointing the asset manager or directly influencing investment policies, direct the pension fund to invest largely in stocks of the sponsor group's companies (Besley and Prat, 2003). Conflicts of interest may also arise when the investments of the PPF's assets are made directly by third party financial institutions, hired specifically for this purpose. These financial institutions may include securities issued by themselves or by some of their clients in the PPFs' asset portfolio (Blecher, 2004).

Governance mechanisms can and must be implemented in order to mitigate potential conflicts of interest (Gillan and Starks 1998). The governance system of Brazilian PPFs is regulated by the government, starting from CGPC Resolution 13, issued on October 1, 2004. This resolution provides that the private pension funds shall adopt principles, rules and governance mechanisms, management practices and internal controls consistent with the funds absolute size, complexity and with the risks related to benefit plans operated by them.

CGPC's Resolution 13 incentivizes the development of governance mechanisms for Private Pension Funds. It specifies and details recommended governance structures and promotes the adoption of codes of governance best practices. The resolution emphasizes the active role of the oversight council and the desired level of professional quality required for directors. Another important issue is the recommendation for risk identification, assessment and monitoring, with additional focus placed on internal controls and the hiring of external auditors (Torres and Santos 2008). This resolution is summarized on Table 1.

Table 1 – Summary of Resolution #13, Issued by CGPC on October 1, 2004

Section	Summarized content
Governance Structure	The Executive Board, the Advisory Board and the supervisory board should foster a culture of internal controls throughout the organization. These governing bodies also need to maintain and promote a conduct guided by high standards of integrity and ethics. The adoption and dissemination of a code of ethics and conduct is recommended. This section also deals with the qualifications and responsibilities for the governance and management. It dictates that people who occupy these bodies need to have qualifications compatible with the complexity of their duties and emphasizes that members are legally responsible for the acts

	and omissions that cause damage to the PPF.
Risks and their monitoring	This section dictates that the PPFs' risks must be permanently identified, assessed, controlled and monitored. Such risks must be categorized by type of exposure and assessed for the probability of occurrence and the potential extent of impact. PPFs' internal controls must be reviewed and improved with the objective of managing and mitigating risks.
Disclosure and Information Systems	The relevant information needs to be disclosed to stakeholders and to the public, considering the cost-benefit ratio of such disclosures. Disclosure should be provided in clear and accessible language, through the use of appropriate tools. The resolution also provides that the pension fund should take action so that the information generated by their systems is consistent.
Reports from the Audit Board	The Audit Board must issue monthly reports with its findings, recommendations and the analysis of the manifestations of those responsible for areas relating to tests performed. This information shall be communicated promptly to the Board.
Final Provisions	Determines that the Advisory Board may buy insurance for litigation costs of current and formers directors and employees, in case of administrative and judicial proceedings arising from regular management acts. However, the PPF is prohibited to buy liability coverage, for criminal or administrative cases.

On December 6, 2006, CGPC issued Resolution 23, setting forth the procedures for providing information to participants and beneficiaries of PPFs. Resolution 23 requires that the statutes and their changes, the financial statements, annual reports, investment policies, plan regulations, and the actuarial report shall be made available to participants and beneficiaries through electronic means. Likewise, Resolution #23 provides hard deadlines for the submission of monthly balance sheets and financial statements to PREVIC.

Lopes et al. (2010) argue that the set of rules issued by CGPC aims to create an environment with minimum standards of economic, financial and actuarial security, preserving the equity of the participants and beneficiaries. It also seeks to provide transparency and improved disclosure of the management of pension funds, through full access for pensioners, who are the actual owners of the assets. In 2012, PREVIC issued a manual on governance best practices for PPFs, largely based on the OECD Guidelines for Pension Fund Governance (Organisation for Economic Co-operation and Development, 2009). This manual's sections are summarized in Table 2, in order to provide an overview of the recommended governance mechanisms.

Table 2 – Summarized descriptions of PREVIC Governance Best Practices Manual

Section	Summarized Description
1 - Governance in PPFs	States that PPFs must have at least one structure consisting of the Audit Board, the Advisory Board and the executive board. Defines the responsibility, composition and how to access each instance. It presents the role of PREVIC on the supervision and punishment to those responsible for acts and omissions contrary to the applicable law.
2 - Conflict of interest and governance	Discusses the importance of the directors and officers conducting the activities of the entities, based on the interest of the participants,

	sponsors and founders, through procedures and clear rules that allow the monitoring of their actions. Sets the principles of transparency, accountability, corporate responsibility and the adoption of internal control mechanisms.
3 - Transparency and communication with participants and sponsors	Commands clear and timely disclosure of information on investment policies, actuarial assumptions economic and financial situation and administrative costs to members of the Advisory Board, sponsors and participants.
4 - Fiduciary duty	States that all officers granted with management powers, as well as statutory board members will be held responsible for damages caused by act or omission.
5 - Code of conduct and ethics	Encourages the adoption of a set of rules of ethical conduct for the purpose of establishing the duties and responsibilities of boards, management, employees with management powers and outsourced service providers operating in the pension fund. States the sanctions to be applicable in case of non-compliance with the rules.
6 - Competence and training of directors and managers	Determines that the entity should adopt practices aimed at the professional training of officers and directors.
7 - Processes and controls,	Recommends the adoption of reasonable decision-making processes, to be disclosed to participants and sponsors, in order to promote transparency in the relationship with the PPF and reduce the potential for conflicts of interest.
8 - Risk management	Discusses the need for the PPF to identify, assess, monitor and control the risks to which it is exposed.
9 - Outsourcing and service providers	Provides that the choice of service providers should be performed by properly structured processes, which ensure the capacity, integrity and the absence of conflict of interest, by the provider. It also states that the managers and board members are not exempt from their responsibilities when hiring specialized services.
10 - Tax advice	Defines that the Audit Board is responsible for the effectively monitoring the PPF's activities. This statutory body has the role of exercising internal controls, supervise and monitor the results and issue reports, disclosing to the PPF and its participants and sponsors. The Audit Board does not exercise operational activities and does not replace the internal audit area.
11 - Entities with multiple plans	Recommends that multi-sponsored and multi-plan PPFs promote the co-responsibility of actions of officers and directors with sponsors and founders. The pension fund may establish a steering committee for the benefit plans in order to track and share decisions and responsibilities of management. However, the powers of the statutory bodies should be respected. The creation of this committee does not result in the transfer of responsibilities, but in sharing and strengthening management.

Between 2006 and 2013, the Brazilian government established regulatory measures aimed at strengthening governance practices for private pension funds. To the best of our

knowledge, there is no empirical analysis on the extant literature dealing with which factors may explain the level and extension of governance mechanisms of the Brazilian PPFs. A deeper knowledge of the factors that result in the adoption of improved structures of governance can contribute not only to the issuance of regulatory measures of governance, but also on how to adjust actual legislation. This study can also assist pension funds on revising their governance systems and expanding their governance mechanisms. In the next section, we detail the hypotheses construction that result from this research's econometric model.

5. FORMULATION OF HYPOTHESES ABOUT THE FACTORS WHICH EXPLAIN THE EXTENT OF THE GOVERNANCE PRACTICES OF THE BRAZILIAN PPFS

Considering the conflicts of interest that impact the management of PPFs, we built a set of six hypotheses aiming to respond to the research problems. These hypotheses are based on the reviewed empirical literature and on the legislation applicable to Brazilian PPFs.

Ammann and Zingg (2008) found that the size of Swiss pension funds have a significant influence on the level of adherence to governance practices. The authors found that medium and small pension funds have serious weaknesses in their system of governance, such as the lack of transparency on the funding target. Lima (2014) found a positive and significant correlation between the highest score in the adherence to voluntary governance practices and the total asset size of Brazilian PPFs.

Since an organization is formed by a network of contracts, it is expected that the larger and more complex the organization is, the larger the number of contracts the organization takes part in. Hence, the system of governance of large pension funds should adopt a greater number of governance mechanisms to deal with the increased possibility of conflicts of interest that it would be exposed to. CGPC's Resolution 13 (CGPC, 2004) determines in its Article 1 that PPFs should adopt governance mechanisms that are compatible with their size. Hence, our first hypothesis is defined as follows (in alternative form):

H1: There is a positive relationship between the size of a pension fund, measured by the amount of its total assets and the extent of its governance practices, ceteris paribus.

There is a conflict of interest whenever the sponsor, in opportunistic behaviour, decides to invest PPFs resources in shares of the sponsor group's companies, without risk-adjusted earnings prospects that justify the investment (Besley and Prat, 2003). This decision's impact is directly proportional to the volume of funds invested in the fund sponsor's related companies. We were not able to obtain access to the detailed portfolio of the sample PPFs, due to the private nature of such information. Resolution 3,792 of 2009 (Banco Central do Brasil, 2009), issued by the Central Bank of Brazil, provides that the financial resources of the PPFs must be invested by the management observing the risk, profitability, solvency and liquidity of the investments.

In order to mitigate possible conflicts of interest arising from the management of large pools of funds, it is expected that pension funds adopt governance mechanisms to give sponsors and participants more information about their investments' management, and the

extension of these governance mechanisms is associated with the percentage of PPFs' funds effectively invested. Therefore, we propose the following hypothesis (in alternative form):

H2: There is a positive relationship between the percentage of invested funds from total assets and the extent of a PPF's governance practices, ceteris paribus.

Another potential conflict of interest to which PPFs are prone, consistent with Jensen and Meckling's (1976) theory, is managers self-benefiting behaviour, manifested through a least-effort attitude. In a PPF, this kind of behaviour could result in increased costs and expenses, impairing participants' funds. In order to mitigate this problem, CGPC' Resolution 13 requires that PPFs maintain a management and operational structure sufficient to run their pension plans, avoiding wasted funds or costs that are not compatible with the fund's size.

Bateman and Mitchell (2004) state that the administrative costs of pension funds are passed on to participants through administrative fees. The increase in expenses and administrative costs may result in increases in these administrative fees, hampering pension funds' capital accumulation. The authors conclude that an increase of 1% in administrative fees over 40 years reduces the pension savings by 27%, by retirement age.

Tan and Cam (2013) found in their research that operating expenses have a negative relationship with the level of voluntary disclosure of governance practices of Australian pension funds. Specifically, the authors found that higher disclosure costs lead to a lower level of disclosure of governance practices. Given this situation, it is possible to infer the following hypothesis (in alternative form):

H3: There is a negative relationship between the level of a PPF's total expenses (divided by total assets) and the extent of governance practices, ceteris paribus.

Blecher (2004) reports that the outsourcing of the investment management function can lead pension funds to invest their resources in assets that are of primary interest to the service provider and not to the PPFs' best interest. Bikker and de Dreu (2007) assumed that outsourcing would have a negative relationship with the administrative costs of the Dutch pension funds. However, they found a positive relationship.

PREVIC's Governance Manual provides that PPFs should adopt governance tools to ensure the integrity of outsourced activities. Article 4 of CGPC's Resolution 13 also requires governance mechanisms in order to ensure that third party service providers have adequate qualifications. In addition, there is a need to constantly optimize the cost-benefit ratio in the management of pension funds. Considering that PPFs with a higher level of outsourced activities should present improved levels of governance in order to mitigate the augmented risk of conflicts of interest, we formulated the following hypothesis (in alternative form):

H4: There is a positive relationship between the level of a PPF's outsourcing expenses and the extent of its governance practices, ceteris paribus.

Ammann and Zingg (2008) claim that fraud and mismanagement of pension funds have put the governance of these organizations at the center of public interest, in countries like

Switzerland, Germany, the Netherlands and the UK. These events could result from conflicts of interest and potentially affect the performance of pension funds. They might even compromise the fund's actuarial balance. Kowalewski (2012) argues that in many countries politicians are paying attention to how the resources of the pension funds are administered and taking into account various reforms to increase the return on investment of pension funds. Research of Yang and Mitchell (2005), Ambachtsheer, Capelle and Lum (2007), Torres and Santos (2008), Ammann and Zingg (2008), Benson et al. (2011) and Kowalewski (2012), identifies a positive relationship between the level of adherence to governance practices and the performance of pension funds.

As shown by the extant literature, the public and political debate on governance in pension funds is often centred on the misuse of the assets of these organizations. However, the governance of pension funds has a much broader scope and includes overall management, organizational design and decision-making processes. Accordingly, we propose the following hypothesis (in alternative form):

H5: There is a positive relationship between the PPF's financial performance and the extent of its governance practices, ceteris paribus.

The sponsor could direct the investment of pension fund assets in assets of its own interest (Besley and Prat, 2003). In Brazil, the study of Ribeiro Filho, Libonati, Lopes and Santiago(2008) identifies this behaviour. The authors found that if the pension fund is sponsored by government entities, investments tend to be directed to government bonds. When the PPF is sponsored by private entities, investments are channelled to financial institutions. Research by Pereira, Niyama and Sallaberry (2004) and Pasqualeto, Mangoni, Da Silva, Teixeira and Macagnan (2014) found that publicly sponsored PPFs have a level of administrative expenses beyond that of the privately sponsored PPFs.

It is noteworthy to emphasize that publicly sponsored and privately sponsored pension funds are subject to different regulatory demands. Publicly sponsored PPFs' directors are frequently appointed based on political decisions, taken by their sponsoring entities. Due to these significant differences between privately and publicly sponsored PPFs, we formulate the following hypothesis (in alternative form):

H6: The extent of governance practices of the PPF is influenced by the private or public nature of the PPF's sponsoring entity, ceteris paribus.

In summary, we present in Table 3 all of these research hypotheses and the predicted signals of the respective coefficients.

Table 3 – Hypotheses and Predicted Signal

Hypotheses	Predicted Signal
1. PPF's assets as of December 31, 2013	(+)

2. Total of invested funds by PPFs as of December 31, 2013	(+)
3. Total of PPF's expenses as of December 31, 2013	(-)
4. Total of outsourcing expenses by the PPF as of December 31, 2013	(+)
5. PPF's financial performance as of December 31, 2013	(+)
6. Whether the PPF has a government related sponsor or is sponsored by private entities	(*)

Positive relation (+)
Negative Relation (-)
Undetermined relation (*)

In the next topic, we present the econometric model developed in order to test the hypothesis set forth in the present section.

6. RESEARCH DESIGN AND SAMPLE SELECTION

Based on the hypothetical factors that could explain the extent of the governance practices of PPFs, we built an OLS regression in order to test for the predicted signal of the form:

$$NG_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \varepsilon_{i.,} \quad (1)$$

where the dependent variable, NG_i is our constructed governance score as proxy for the extent of governance practices of the PPF_i. NG_i was built through the development of a computed governance score, containing 34 questions regarding governance indicators for private pension funds, detailed on Appendices A and B.

These indicators of governance were based on the applicable legislation governing PPF's governance, including the Federal Complementary Laws #108/2001 and #109/2001, Resolution CGPC #13/2004 and # 26/2006 and PREVIC's Best Practices Manual regarding the governance of PPFs. All of the PPFs scoreboards were calculated based on the observation of the PPFs websites. The detailed composition of the governance score is explained in detail on Appendices A and B.

The governance indicators included on the computed score were submitted to the evaluation of five experts whom work at PPFs, in management or governance jobs. These professionals provide services to publicly sponsored large private pension funds such as Bank of Brazil's PPF (Previ), Banrisul Social Security Foundation, CEEE Social Security Foundation and Corsan Foundation. We also consulted on the indicator's validity with PRP Accounting Solutions, a company specialized at providing professional services to PPFs. The experts' contribution helped in classifying the nature of the indicators, as well as in refining the definition, exclusion and replacement of indicators.

In order to quantify the responses obtained through the data collection, we attributed each indicator a value of one when the PPF *i* provides the data regarding the indicator on its website,

and zero otherwise. page of the respective organization. If data regarding the indicator was not available, it was assumed the value (0). The level of adherence to governance practices of each of the sample's PPFs was then measured in the following form:

$$NG_i = \frac{\sum_{i=1}^{n} x_{ij}}{n_i} \quad (2)$$

where the total number of governance indicators for each PPF_i is given by *ni*, the actual number of positive indicator $_j$ is given by the sum of indicators x_{ij}. When the indicator x_{ij} is present, it is given a value of one, and zero otherwise. This computation is usual on the extant literature on the governance of PPFs, and results in a percentage level (NG_i), which is taken as our model's dependent variable.

Table 4 presents a summary of the definition of our model's explanatory variables, adopted in order to allow for the testing of the hypotheses formulated in the previous section.

The RENT variable was based on the gross return on investment from the PPF's investment portfolio. We were not able to obtain the necessary data for estimating risk-adjusted returns, Sharpe ratios or Traynor ratios. Regarding the RTMA Variable, Resolution CNPC 09/2012 determines that the maximum real interest rate allowed in the actuarial projections of the benefit plan, utilized in 2013 in order to discount the calculation of the present value of the contribution inflows and benefits is 5.75% per year plus the INPC (which is an inflation measure). This rate is taken as the minimum actuarial target. PPFs are recommended to achieve a return on investment above the minimum actuarial target, in order to maintain actuarial balance. For this variable, a dummy variable taking value of "1" was considered when the PPF reached profitability higher than the actuarial target.

Table 4 – Explanatory Variables

Hypothesis	Explanatory Variable	Description
H1 - Size	ATV	Log of Total Assets
	PART	Log Number of participants.
	PLN	Number of pension plans offered.
H2 - Invested Funds	INV	Total amount of invested funds divided by total assets
H3 - Total Expenses	DESP	Total amount of expenses divided by total assets
H4 - Outsourcing Expenses	DESPT	Total amount of outsourcing expenses
H5 - Financial Performance	RENT	Return made by the PPF on its investment portfolio
	RTMA	Dummy variable for PPFs that obtained a return on their investments superior to their minimum actuarial rate (as set by PREVIC)
H6 - Kind of Sponsorship	PAT	Factor identifying whether the PPF's sponsoring entity is of government or private nature.

6.1. Population, Sample and Data Collection

PREVIC classifies pension funds into classes according to the amount of their total assets, as presented in Table 5. In our sample, we included PPFs of the Groups A, B and C, totalling 125 pension funds. The total of the sample of PPFs' assets is representative of 96,15% of the total assets of the population of PPFs. In the same manner, the total amount of invested funds by the sample PPFs represents 96,08% of the total invested funds of all PFFs. Subsequently, we searched each of the sample PPF's website, and analysed the availability of information on the existing websites, resulting in a final sample comprising 110 PPFs.

Table 5 – PPF Classes as defined by PREVIC

Class	Assets
A	Assets > R$ 15 billion
B	R$ 2 billion ≤ Assets < R$ 15 billion
C	R$ 500 million ≤ Assets < R$ 2 billion
D	R$ 100 million ≤ Assets < R$ 500 million

E	R$ 100 million < Assets

Data collection in order to compute the dependent variables for our regressions, which proxies for the level of adherence to governance practices (NG), was carried out based on the information disclosed by PPFs on their websites. Whenever required information was not directly observed through navigating the entity's website, the search tool provided by the website was utilized. The data was collected in December 2014. It is important to note that the data collected refers to information that was current at the time of collection, with the exception of the Annual Information Report (RAI), whose information corresponds to the year 2013, the most recent RAI available at the time of data collection. Data regarding the model's explanatory variables were made available by the PREVIC, and refer to the year 2013.

6.2 Descriptive analysis of data

In Table 6, Panel A, summary statistics for the behaviour of the sample PPFs' NG_i variable are presented. Given that PPFs can be categorized as sponsored by government owned entities or by private entities, Panels B and C of Table 6 present summary statistics for NG_i for both categories of PPFs. Differences between publicly and privately sponsored PPFs' mean scores are all significant, at least at the 5% level. Overall, the mean level of NG_i for the sample of PPFs was 17.27, corresponding to the adoption of 50.79% of the possible indicators of governance. This indicates that Brazilian PPFs do not present a high level of adherence to governance best practices. Moreover, sample PPFs adhere to mandatory governance practices more frequently than their adherence to voluntary practices.

Table 6 – Summary statistics regarding PPFs' NG_i (N = 110 PPFs)

Panel A – All PPFs within sample				
Category of Governance practice	Maximum	Mean	Minimum	Standard Deviation
Voluntary	15	5.55	1	2.46
Mandatory	17	11.73	3	2.63
Both	30	17.27	4	4.11
Panel B – PPFs sponsored by government entities				
Category of Governance practice	Maximum	Mean	Minimum	Standard Deviation
Voluntary	15	6.62	3	2.41
Mandatory	17	12.44	7	2.14
Both	30	19.07	13	3.45
Panel C – PPFs sponsored by private entities				
Category of Governance practice	Maximum	Mean	Minimum	Standard Deviation
Voluntary	9	4.80	1	2.23
Mandatory	15	11.23	3	2.83
Both	23	16.03	4	4.09

Our results are similar to those reported by Lima (2014), which, based on an Institutional Theory framework, identified that the level of adoption and disclosure of mandatory governance

practices by PPFs is superior to that of voluntary practices. Nonetheless, Lima (2014) reports an average percentage of 75% for the level of adoption and disclosure of governance practices for its sample of PPFs, a much higher percentage than the one reported in our paper, namely 50,79%.

On average, the level of adherence of PPFs sponsored by government entities to governance practices within our sample is 19.07 points, representing 56.08% of the total indicators. Just as for the full sample, PPFs sponsored by government entities also tend to adhere more strongly to mandatory governance practices. On average, these organizations have a 12.44 points score, which corresponds to 73.20% of the total mandatory governance indicators. For PPFs sponsored by private entities, we found that, on average, adherence to governance practices was 16.03 points, representing 47.14% of total indicators. The adherence of privately sponsored PPFs to mandatory governance practices is stronger when compared to voluntary practices, but weaker than the adherence presented by publicly sponsored PPFs.

Our results show that the PPFs sponsored by government entities tend to have better levels of governance compared to those PPFs of private sponsorship. This finding could be explained by the size of the pension funds. In our sample, 53% of the government sponsored PPFs are within groups A and B of PREVIC size stratification. This means that they have assets in excess of R$ 2 billion. Regarding Privately sponsored PPFs, however, only 31% have assets in excess or R$ 2 billion.

The governance practices adopted by the highest frequency of PPFs were: (i) the disclosure of the PPFs charter (equivalent to their bylaws) and (ii) the representation, within the PPFs charted, of detailed description of responsibilities, composition, duration and termination of mandate for the members of the PPF's statutory bodies. These indicators presented an adherence of 96.36%. This result is expected because these indicators are required by virtue of laws and resolutions applicable to PPFs. It should also be noted that the indicators regarding annual report disclosure, code of ethics and governance manual presented adoption of 74.55%, 72.73% and 30.31%, respectively. Vasquez's (2007) research found similar results. The level of disclosure of the PPFs' charter was 88.89%, the annual report was 71.43% and the governance manual was 26.98%. The only result significantly different was the code of ethics, which had a disclosure rate of 52.38%.

The indicators that have the lowest level of adherence by PPFs are (i) existence of internal regulations for the constituted committees, (ii) internal audit reporting directly to the deliberative council, and (iii) semi-annual reports of internal controls, issued by the Audit Board. For these indicators only 6 of the sample's PPF have demonstrated to adopt such governance practices. The indicators regarding (i) the existence of internal regulations for the boards of directors and (ii) the disclosure of the directors and officer's qualifications, also presented low adherence. The former was reported by 09 PPFs and the latter by 10 PPFs. These results are convergent to those presented by Lopes et al (2010).

Summary statistics regarding quantitative explanatory variables are presented in Table 7.

Table 7 – Summary statistics of Quantitative explanatory variables (N = 110 PPFs)

Quantitative explanatory variables	Mean	Maximum	Minimum	Standard Deviation
Log Total Assets	21.39	25.87	20.03	1.15
% Invested Funds	0.96	1.00	0.54	0.07
% log Total Expenses divided by log Total Assets	0.75	0.84	0.62	0.03
% Outsourced Services Expense	0.30	0.94	0.04	0.23
Log number of Participants	9.03	12.06	6.37	1.16
Return on investments	0.02	0.14	-0.14	0.06
Log quantity of plans offered	0.94	3.76	0	0.79

The average total value of sample PPFs' assets is R$ 5.67 billion. Of this total assets, an average of R$ 5.4 billion is invested. Thus, the average percentage of invested assets corresponds to 96% of total assets. The average expenses of sample PPFs is R$ 20.85 million, and on average, 30% of these expenses are outsourced services, which is equivalent to an average of R$ 4.26 million. The average number of participants is 17,409, and the average number of benefit plans under the PPFs' management if 4. Finally, the pension funds analysed in this research earned an average return of 2% on the investments made. Variables Total Assets (ATV), Total expenses (DESP), number of participants (PART) and number of plans (PLN) were estimated in natural logarithm form, due to their standard deviation being greater than their means.

Finalizing this descriptive analysis of the explanatory variables considered in the model, regarding the dichotomous variables, it was found that of the 110 pension funds studied, 65 are privately sponsored and 45 are publicly sponsored. Of this total, only 2 had profitability higher than the maximum actuarial target.

The analysis of the correlation coefficient between the variables is presented in Table 8. Correlation indexes higher than 0,8, if observed, are considered an indication of multi-collinearity, and should be dealt with appropriately. The variables Number of Participants (PART) and Total Expenses (DESP) are moderately correlated, as are the variables, kind of sponsorship (PAT) and expenses related variables (DESP and DESPT). No pair of variables presents unacceptable correlation coefficients. Thus, all of the variables were considered in the estimation of the econometric model, presented on the following section.

Table 8 – Variables Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
1. NGFP	1									
2. DESP	0.19	1								
3. DESPT	-0.37	**-0.54**	1							
4. INV	-0.02	-0.24	0.30	1						
5. ATV	0.35	0.20	-0.20	-0.12	1					
6. PART	0.01	-0.03	0.09	-0.03	**0.65**	1				
7. PAT	-0.36	**-0.54**	**0.52**	0.34	-0.23	-0.02	1			
8. PLN	0.13	0.21	-0.19	-0.08	0.45	0.42	-0.05	1		
9. RENT	0.10	0.03	-0.18	-0.02	-0.02	-0.09	-0.03	-0.16	1	
10. RTMA	0.14	-0.09	-0.09	-0.14	0.15	0.07	-0.03	0.05	0.26	1

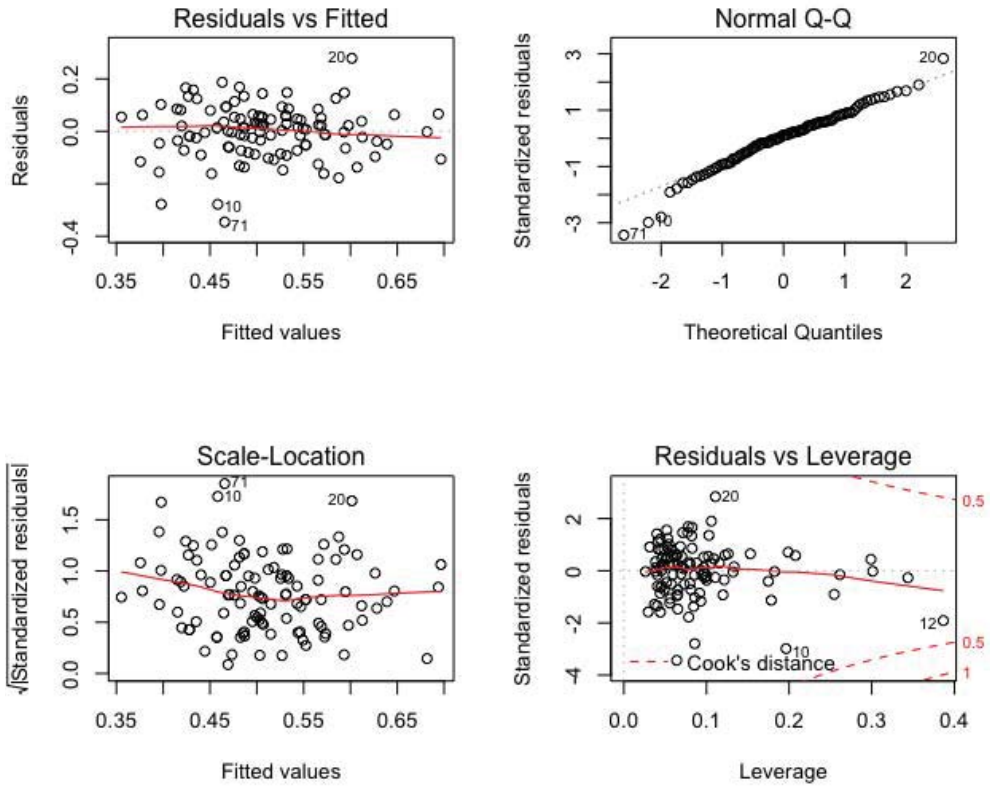
7. MULTI-VARIATE LINEAR REGRESSION ANALYSIS

The estimation of the econometric model described in equation (1) followed OLS regression on cross-sectional data regarding calendar year 2013, with a sample of 107 observations, due to the exclusion of three outliers, presented in Table 9, which resulted on non-normally distributed residuals, as shown in figure 3. Results with the unadjusted sample were statistically significant at 1% for variables representing size and kind of sponsoring entities. Since our sample of PPFs is small, having only 110 total observations, residuals with non-normal statistical distribution could result in biased or inefficient estimators.

Table 9 – Summarized information about the observations excluded from the sample, due to their large effect on residuals, resulting in non-normally distributed residuals from estimating equation (1)

PPF	NG*i*	Assets (Billion BRL)	Sponsor	Participants	Class
BB PREVIDENCIA	0.18	2.235	Private	71,776.00	B
CERES	0.88	4.017	Federal Government	16,741.00	B
ODEPREV	0.12	1.616	Private	16,413.00	C

Figure 3 – Analysis of residuals



Note: Plots regarding the analysis of residuals from the estimation of equation (1) with all the observations within the sample. Observations 10, 20 and 71 are the observations with larger estimation errors.

Results of the estimation of equation (1) with the adjusted sample are presented in Table 10. Residuals are normally distributed, but it was not possible to reject the alternative hypothesis of heteroscedasticity through the Breusch-Pagan test. Because of that, results in Table 10 are presented with robust standard errors and consequently robust p-values (using White's estimator).

Considering the differences between PPFs sponsored by government entities and by private entities, additional models were estimated separately for each kind of sponsor. Summarized results are presented in Table 11. P-values regarding Private Sponsor regression are robust for heteroscedasticity (White's correction).

Table 10 – OLS Regression results - Adjusted Sample

OLS regression parameter estimates are reported from the model based on equation (1): $NG_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \varepsilon_i$.. Variable definitions are contained in Table 4. Statistical significance represented by ***, **, and * for 1%, 5%, and 10% levels, respectively.

Dependent Variable: NG_i

Observations: 107

Variables	Coefficient	Robust Std.-Errors	T-Statistic	P-Value	
DESP	-0.3194261	0.2905421	-10994	0.274309	
DESPT	**-0.1487905**	**0.0570649**	**-26074**	**0.010564**	**
INVEST	0.2663362	0.1679587	15857	0.116057	
ATV	**0.0380559**	**0.0088459**	**43021**	**0.000000**	***
PART	-0.0136590	0.0097427	-14020	0.164114	
PAT	**-0.0444112**	**0.0238626**	**-18611**	**0.065755**	*
PLN	-0.0021282	0.0139812	-0.1522	0.879331	
RENT	-0.1139937	0.1345664	-0.8471	0.399014	
RTMA	**0.0948542**	**0.0251698**	**37686**	**0.000282**	****
Intercept	-0.1221325	0.3083189	-0.3961	0.692884	

R-squared	0.3594	Adjusted R-squared	0.3
F-Statistic	6.047	Prob (F statistic)	1,05E-03
Durbin-Watson	203.642		

*** 1% significance, ** 5% significance e *10% significance.

Source Prepared by the authors

Table 11 – OLS Regression results - Adjusted Sample - By category of sponsor

OLS regression parameter estimates, considering split samples due to the nature of the sponsoring entity, are reported from the model: $NG_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \varepsilon_i$.. Variable definitions are contained in Table 4. Statistical significance represented by coefficients and p-values in bold font. Standard errors and t-values suppressed for brevity.

Dependent Variable: NG_i

	Private Sponsor		Government Sponsor	
Observations:	63		44	
Variables	Coefficient	P-Value	Coefficient	P-Value
DESP	-0.220718	0.65915	-0.417229	0.5676
DESPT	**-0.159766**	**0.00648**	-0.041724	0.8097
INVEST	**0.474400**	**0.01145**	0.010520	0.9570
ATV	**0.048412**	**0.00775**	**0.035434**	**0.0419**
PART	-0.023261	0.14485	-0.008344	0.6580
PLN	0.002291	0.91284	-0.012173	0.5663
RENT	-0.076757	0.72747	-0.160887	0.5276
RTMA	0.084482	0.17986	0.122210	0.2203
Intercept	-0.574599	0.26461	0.190267	0.7706
Adjusted R Squared	0.2677		0.05512	

Durbin Watson	1.882747	1.864.467
Breusch Pagan p-value	0.04965	0.2283

Source: Prepared by the authors

Based on the assumption that one should expect a higher variance between the level of adoption of voluntary governance practices, when compared to the expected adoption of the mandatory practices, a modified estimation of equation (1) replacing the dependent variable (NG_i) for the percentage of voluntary governance practices adopted by PPFs was run. Results are reported on Table 12. P-values regarding Private Sponsor regression are again robust for heteroscedasticity (White's correction).

Table 12 – OLS Regression results - Adjusted Sample - By category of sponsor

OLS regression parameter estimates, considering split samples due to the nature of the sponsoring entity, are reported from the model: $VoluntaryNG_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \varepsilon_i$. $VoluntaryNG_i$ is estimated following NG_i estimation, but only considering voluntary governance practices. Variable definitions are contained in Table 4. Statistical significance represented by coefficients and p-values in bold font. Standard errors and t-values suppressed for brevity.

Dependent Variable: $VoluntaryNG_i$

	Private Sponsor		Government Sponsor	
Observations:	63		44	
Variables	Coefficient	P-Value	Coefficient	P-Value
DESP	**0.815564**	**0.031399**	-0.929440	0.336
DESPT	**-0.148617**	**0.003966**	-0.283310	0.220
INVEST	0.148372	0.341194	0.283627	0.274
ATV	**0.052284**	**0.003783**	0.024498	0.276
PART	**-0.033218**	**0.038258**	0.020569	0.410
PLN	0.017666	0.339170	0.001879	0.946
RENT	0.080938	0.695913	-0.173059	0.606
RTMA	**0.077326**	**0.086966**	-0.078253	0.548
Intercept	-1.223031	0.003595	0.161601	0.851
Adjusted R Squared	0.3341		0.07176	
Durbin Watson	1.944319		2.187068	
Breusch Pagan p-value	0.04469		0.3926	

Source: Prepared by the authors

In order to provide a better view of the hypothesis testing results, in Table 13 the resulting signals, attributing the n/s notation for non-significant results are presented.

Table 13 – Signals from the hypothesis testing results

Note: Results from tables 10 to 12, depending on the signal and statistical significance of the corresponding coefficients. We adopted the "n/s" description for non-significant coefficients.

Hypothesis	**Explanatory Variable**	**Results**					**Predicted Signal**
Dependent Variable		**NG_i**			**Voluntary Practices**		
		All	**Private**	**Government**	**Private**	**Government**	

H1 - Size	ATV	+	+	+	+	n/s	+
	PART	n/s	n/s	n/s	-	n/s	+
	PLN	n/s	n/s	n/s	n/s	n/s	+
H2 - Invested Funds	INV	n/s	+	n/s	n/s	n/s	+
H3 - Total Expenses	DESP	n/s	n/s	n/s	+	n/s	-
H4 - Outsourcing Expenses	DESPT	-	-	n/s	-	n/s	+
H5 - Financial Performance	RENT	n/s	n/s	n/s	n/s	n/s	+
	RTMA	+	n/s	n/s	+	n/s	+
H6 - Kind of Sponsorship	PAT	-					(*)

Results presented in Table 13 indicate a consistent positive and significant relationship between total asset size and the extent of governance practices, except for non-significant results regarding the relationship between total asset size and voluntary practices, regarding government sponsored entities. These results converge with Ammann and Zingg (2008) and Lima, Oliveira, Ponte and Rebouças (2016), being different from those reported by Tan and Cam's (2013) paper, in which there is no statistical significance regarding the relationship between asset size and voluntary disclosure of Australian PPFs' governance mechanisms.

The total number of participants from each PPF is negatively related to the extent of voluntary governance practices, but only regarding privately sponsored pension. This variable is non-statistically significant in all of the remaining tests. The relationship between the number of plans offered by the PPF and its NG_i is not significant. Overall, these results provide reasonable evidence regarding the positive effect of the PPF's size, particularly when measured by the PPF's asset size, on the fund's extent of governance practices.

The percentage of invested funds is positive and significantly related to the extent of governance practices, but only for privately sponsored funds, being non-significant otherwise. Contrary to hypothesis 3, total expenses are not positively and significantly related to the extent of PPF's governance practices. The only exception is the positive effect of total expenses on the adoption of voluntary practices of governance by privately sponsored PPFs, and this effect is in accordance with the predicted signal.

The hypothesis stating that a positive relationship exists between the extension of governance practices and the outsourcing of pension fund activities was formulated considering CGPC Resolution No. 13/2004, which provides that the governance mechanisms of closed entities should ensure the qualification of outsourced service providers. The results, however, show that the level of outsourced expenses has a negative and significant relationship with the extent of governance practices, with the exception being models for which regressions were only estimated for a sample of government sponsored PPFs.

The results reported in the previous paragraph, along with the negative signal (p-value of 0.06) of the PAT variable indicating that private PPFs have a lower level of NG_i, suggest that PPFs sponsored by private and government entities have a significantly different data generating process regarding the extent of their governance practices. Our results are different

from those reported in Tan and Cam's (2013) paper, in which no relationship could be proven between the type of pension fund sponsorship, and the level of voluntary disclosure of Australian pension fund governance practices.

Overall, a consistently poor performance of explanatory variables on explaining the variance of the level of governance practices on PPFs sponsored by the Government is reported in Tables 11 and 12. There is a plausible possibility that this poor performance may be caused by considering that PPFs sponsored by federal and state governments are sufficiently similar to be classified as part of the group of publicly sponsored PPFs. In order to investigate further this possibility Table 11 and 12's regressions were re-estimated with the inclusion of a dummy variable that takes value 1 for all PPFs sponsored by entities controlled by the Federal Government. Results are presented in Table 14.

Table 14 – OLS Regression results - Adjusted Sample - By category of public sponsor

OLS regression parameter estimates, considering sample of publicly sponsored entities, are reported from the models:

$NG_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \beta_{10}(\text{Federal Sponsor}) + \varepsilon_i$; and

$\text{VoluntaryNG}_i = \beta_0 + \beta_1 (ATV_i) + \beta_2 (PART_i) + \beta_3 (PLN_i) + \beta_4 (INV_i) + \beta_5 (DESP_i) + \beta_6 (DESPT_i) + \beta_7 (RENT_i) + \beta_8 (RTMA_i) + \beta_9 (PAT_i) + \beta_{10}(\text{Federal Sponsor}) + \varepsilon_i$..

Federal Sponsor is a dummy variable that takes the value of 1 when the sponsoring entity is related to the Brazilian Federal Government and zero otherwise. Variable definitions are contained in Table 4. Statistical significance represented by coefficients and p-values in bold font. Standard errors and t-values suppressed for brevity.

Dependent Variable:	NG_i		VoluntaryNG_i	
Observations:	44		44	
Variables	Coefficient	P-Value	Coefficient	P-Value
DESP	-1.305778	0.1065	**-2.2210151**	**0.0367**
DESPT	-0.212787	0.2430	**-0.5319634**	**0.0283**
INVEST	-0.170314	0.3994	0.0207717	0.9365
ATV	0.021555	0.2132	0.0043240	0.8456
PART	-0.001112	0.9510	0.0310821	0.1907
PLN	-0.012845	0.5224	0.0009024	0.9723
RENT	-0.077669	0.7494	-0.0520952	0.8687
RTMA	0.047560	0.6314	-0.1867634	0.1518
Federal_Sponsor	**0.080402**	**0.0295**	**0.1168702**	**0.0155**
Intercept	1.263408	0.1114	1.7214937	0.0950
Adjusted R Squared	0.1557		0.1977	
Durbin Watson	1.708803		1.991542	
Breusch Pagan p-value	0.6689		0.3926	

Source: Prepared by the authors

Interestingly, PPFs sponsored by Federal Government related entities have a greater extent of adopted mechanisms of governance than that of PPFs sponsored by state government related entities. Regarding Hypothesis H5, which predicted a positive relation between a PPF's financial performance, measured by its investment portfolio return (RENT) and returns above the minimum returns required by PREVIC (RTMA), mixed results were found. The null

hypothesis of no effects regarding the return on investment (RENT) could not be rejected. It must be emphasized, though, that we only had access to data regarding the overall return on investment from each of the sample's PPF. The riskiness of the PPFs portfolio due to unavailable data could not be investigated. Measuring the effect of risk adjusted returns on the extent of a PPF's extent of governance practices is an important avenue for future research. RTMA is a statistically significant predictor of the extent of the PPF's governance practices only when the full sample is analysed, or when voluntary practices and privately sponsored PPFs are analysed.

There is a potentially endogenous relationship between the PPF's financial performance and the extent of its governance practices, indicating that the model could suffer from simultaneity bias. Theoretically, one cannot rule out the possibility that both constructs are jointly determined as a function of some specific characteristic of the PPF. Addressing this issue is an interesting possibility for future research, through an approach with instrumental variables, such as personal characteristics of the PPF's investment managers, which should be correlated with financial performance, but not necessarily correlated with the PPFs extent of governance practices.

Based on the results reported in this section, concluding remarks are presented in the following section.

8. CONCLUDING REMARKS

This paper analyses the explanatory factors of the extension of governance practices adopted by Brazilian Private Pension Funds. Through information disclosed in PPFs' websites, a governance score composed of 34 governance indicators was computed for each PPF. These indicators were based on the applicable legislation and the governance manual for closed entities issued by PREVIC. The governance score was submitted to evaluation and validation by professionals who work in the management and governance of Brazilian PPFs.

The level of adherence to governance practices of Brazilian pension funds was measured, indicating that Brazilian PPFs have a low average level of adherence to governance practices. PPFs of public sponsorship have a better level of adherence, when compared to PPFs of private sponsorship. One potential solution we hypothesize for improving the governance of both private and publicly sponsored private pension funds is turning voluntary practices into mandatory ones. Although adherence to mandatory practice is not complete, it will provide PREVIC with greater enforcement power, as that agency will be able to impose fees on PFs that fail to comply with mandatory practices.

Hypotheses tests summarized in Table 13 indicate that the size of the PPF's assets has a positive and mostly significant relationship with the level of adherence to the governance practices. However, the type of sponsorship and the usage of outsourced services have a negative relationship with the extent of governance practices. This result is puzzling, since Private Funds that are not directly involved on investment management should provide greater disclosure and adopt a higher level of governance in order to allow participants a better understanding of their risks and performances. Due to that, we believe that PPFs that outsource significant activities should be require to provide specific and detailed disclosure regarding this outsourcing.

Data analysis also suggests that privately sponsored PPFs and their publicly sponsored counterparts are significantly different within the Brazilian context. Explanatory factors regarding publicly sponsored PPFs explain poorly the variance of the extent of their governance practices (R-squared of 0.05512, compared to an R-squared of 0.2677 for privately sponsored pension funds).

Regarding the publicly sponsored PPFs in the sample, asset size is the only significant explanatory factor. However, after controlling for the type of public sponsor (either linked to the federal or state government), it was found: (i) that funds sponsored by federal government entities have a higher level of adherence to best governance practices, and (ii) size of total assets ceases to be a statistically significant variable, and the variables that measure the level of expenses and the percentage of outsourced expenses become negatively significant.

This research was constrained by the lack of a centralized public database containing governance, accounting, financial and other data regarding all Brazilian PPFs. The impossibility of collecting historical information on the governance of PPFs, in their respective electronic pages, did not allow us to conduct an analysis of their governance behavior for more than a single year, making it difficult to conduct panel data studies. In the same sense, we were not able to obtain detailed information about the composition and returns of the assets in the PPFs' investment portfolios, which would have allowed us to consider risk-adjusted returns as potential explanations of the level of governance.

Future studies could extend the sample in such a way as to cover a larger number of PPFs and reporting periods, allowing for panel data studies, covering longer periods of time and allowing a dynamic analysis of PPFs' behaviour. In addition, studies could be done that consider the identification of valid instrumental variables that are correlated with the financial performance of the funds, but not with the extension of the governance practices of the funds. This approach would allow for the study of the potential endogenous relationship between financial performance variables and the dependent variable.

We cannot theoretically rule out the possibility that the OECD's (Organisation for Economic Co-operation and Development, 2009) guidelines for fund governance are insufficient for the case of Brazilian Pension Funds. In this sense, an in depth analysis of pension funds on emerging markets that have been through demographic changes regarding ageing population, such as South Korea, could provide important insights regarding governance mechanisms suitable for this transition.

The low adherence to best practices of Governance by Brazilian PPFs is alarming, and it must be addressed by proper legislation and expanded action of the responsible regulatory agency. If there is no improvement in PPFs governance mechanisms and active monitoring by fund's participants, future retirees could face a difficult future, not being able to rely on their private pension money in order to meet their financial needs.

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APPENDIX A – SUMMARY STATISTICS REGARDING PUBLICLY SPONSORED PPFS' GOVERNANCE PRACTICES

(continues)

Code	Indicator	Nature	Average	Standard Deviation	Sum	N
1	Does the statute provide for the duties, composition, manner of access, duration and termination of the term of office of members of statutory bodies?	Mandatory	1.0000	0.0000	45	45
2	Does the PPF announce its electoral process for the vacancies of the deliberative and audit boards?	Voluntary	0.6667	0.4767	30	45
3	Does the PPF present the minimum criteria (qualification and suitability) for the eligibility for positions in statutory bodies?	Mandatory	0.8889	0.3178	40	45
4	Does the PPF disclose the other activities carried out by the directors in order to identify if they do not hold positions in other statutory bodies of the pension fund itself?	Mandatory	1.0000	0.0000	45	45
5	Does the PPF disclose the qualification of directors, officers and board members?	Voluntary	0.1778	0.3866	8	45
6	Does PPF demonstrate that it qualifies its directors, officers and employees periodically to keep them permanently up-to-date?	Voluntary	0.3556	0.4841	16	45
7	Are regular meetings scheduled for all statutory bodies?	Voluntary	0.5556	0.5025	25	45
8	Does the PPF have other technical advisory bodies in addition to those required by law (such as investment, risk, among others)?	Voluntary	0.7333	0.4472	33	45
9	Does The PPF have an Ethics Committee?	Voluntary	0.2000	0.4045	9	45
10	Does the PPF have any procedures that ensure that the qualifications and experience of outsourced contractors are adequate to their tasks, as well as, there is no conflict of interest?	Mandatory	0.3778	0.4903	17	45

11	Does the PPF have tools for monitoring and evaluating the performance of outsourced service providers?	Mandatory	0.3556	0.4841	16	45
12	Does the PPF disclose its statutes?	Mandatory	1.0000	0.0000	45	45
13	Does the PPF disclose its internal regulations?	Voluntary	0.1333	0.3438	6	45
14	Are there internal regiments containing the rules of functioning of the constituted boards?	Voluntary	0.1333	0.3438	6	45
15	Are there internal regiments containing the rules of functioning of the constituted committees?	Voluntary	0.0889	0.2878	4	45
16	Does the PPF adopt a Governance Manual?	Voluntary	0.3333	0.4767	15	45
17	Does the PPF have an ethics code?	Voluntary	0.8222	0.3866	37	45
18	Does the PPF disclose its process of identification, evaluation, control and monitoring of risks?	Mandatory	0.8000	0.4045	36	45

APPENDIX A – SUMMARY STATISTICS REGARDING PUBLICLY SPONSORED PPFS' GOVERNANCE PRACTICES

(conclusion)

Code	Indicator	Nature	Average	Standard Deviation	Sum	N
19	Does the PPF have an internal control body?	Voluntary	0.1333	0.3438	6	45
20	Is the internal controls body bound to statutory bodies?	Voluntary	0.1333	0.3438	6	45
21	Is there an internal audit department or function in the PPF?	Voluntary	0.2000	0.4045	9	45
22	Is the internal audit sector linked to the deliberative council?	Mandatory	0.0667	0.2523	3	45
23	Does the PPF disclose investment policies?	Mandatory	0.7556	0.4346	34	45
24	Does the PPF disclose relevant actuarial assumptions?	Mandatory	0.8889	0.3178	40	45
25	Are there communication channels that allow participants to access information regarding the PPF and its pension plans in an individualized way?	Voluntary	0.9333	0.2523	42	45
26	Has the PPF submitted its last annual report?	Mandatory	0.7111	0.4584	32	45
27	The date of issuance of the financial statements is before March 31 of the subsequent year?	Mandatory	0.9778	0.1491	44	45
28	Does the PPF have external auditors?	Mandatory	1.0000	0.0000	45	45
29	Does the PPF disclose the benefits plan regulation?	Mandatory	0.9333	0.2523	42	45
30	Is there disclosure of the person responsible for the applications of PPF resources?	Mandatory	0.6667	0.4767	30	45
31	Is there disclosure of the custodian of PPF resources?	Voluntary	0.4444	0.5025	20	45
32	Does the PPF provide the semi-annual report on internal controls issued by the audit board?	Mandatory	0.0444	0.2084	2	45

33	Does the PPF provide the conclusive opinion on the financial statements issued annually by the audit board?	Mandatory	0.9778	0.1491	44	45
34	The PPF adopts socio-environmental actions?	Voluntary	0.5778	0.4995	26	45

APPENDIX B – SUMMARY STATISTICS REGARDING PRIVATELY SPONSORED PPFS' GOVERNANCE PRACTICES

(continues)

Code	Indicator	Nature	Average	Standard Deviation	Sum	N
1	Does the statute provide for the duties, composition, manner of access, duration and termination of the term of office of members of statutory bodies?	Mandatory	0,938462	0,242186	61	65
2	Does the PPF announce its electoral process for the vacancies of the deliberative and audit boards?	Voluntary	0,430769	0,499038	28	65
3	Does the PPF present the minimum criteria (qualification and suitability) for the eligibility for positions in statutory bodies?	Mandatory	0,507692	0,503831	33	65
4	Does the PPF disclose the other activities carried out by the directors in order to identify if they do not hold positions in other statutory bodies of the pension fund itself?	Mandatory	0,861538	0,348072	56	65
5	Does the PPF disclose the qualification of directors, officers and board members?	Voluntary	0,030769	0,174036	2	65
6	Does PPF demonstrate that it qualifies its directors, officers and employees periodically to keep them permanently up-to-date?	Voluntary	0,138462	0,348072	9	65
7	Are regular meetings scheduled for all statutory bodies?	Voluntary	0,246154	0,434122	16	65
8	Does the PPF have other technical advisory bodies in addition to those required by law (such as investment, risk, among others)?	Voluntary	0,523077	0,503354	34	65
9	Does The PPF have an Ethics Committee?	Voluntary	0,092308	0,291712	6	65
10	Does the PPF have any procedures that ensure that the qualifications and experience of outsourced contractors are adequate to their tasks, as well	Mandatory	0,461538	0,502398	30	65

	as, there is no conflict of interest?					
11	Does the PPF have tools for monitoring and evaluating the performance of outsourced service providers?	Mandatory	0,307692	0,46513	20	65
12	Does the PPF disclose its statutes?	Mandatory	0,938462	0,242186	61	65
13	Does the PPF disclose its internal regulations?	Voluntary	0,138462	0,348072	9	65
14	Are there internal regiments containing the rules of functioning of the constituted boards?	Voluntary	0,046154	0,211451	3	65
15	Are there internal regiments containing the rules of functioning of the constituted committees?	Voluntary	0,030769	0,174036	2	65
16	Does the PPF adopt a Governance Manual?	Voluntary	0,292308	0,458362	19	65

APPENDIX B – SUMMARY STATISTICS REGARDING PRIVATELY SPONSORED PPFs' GOVERNANCE PRACTICES

(concludes)

Code	Indicator	Nature	Average	Standard Deviation	Sum	N
17	Does the PPF have an ethics code?	Voluntary	0,661538	0,476869	43	65
18	Does the PPF disclose its process of identification, evaluation, control and monitoring of risks?	Mandatory	0,784615	0,414288	51	65
19	Does the PPF have an internal control body?	Voluntary	0,092308	0,291712	6	65
20	Is the internal controls body bound to statutory bodies?	Voluntary	0,076923	0,268543	5	65
21	Is there an internal audit department or function in the PPF?	Voluntary	0,107692	0,312404	7	65
22	Is the internal audit sector linked to the deliberative council?	Mandatory	0,046154	0,211451	3	65
23	Does the PPF disclose investment policies?	Mandatory	0,784615	0,414288	51	65
24	Does the PPF disclose relevant actuarial assumptions?	Mandatory	0,846154	0,363609	55	65
25	Are there communication channels that allow participants to access information regarding the PPF and its pension plans in an individualized way?	Voluntary	0,938462	0,242186	61	65
26	Has the PPF submitted its last annual report?	Mandatory	0,769231	0,424604	50	65
27	The date of issuance of the financial statements is before March 31 of the subsequent year?	Mandatory	0,830769	0,377874	54	65
28	Does the PPF have external auditors?	Mandatory	0,846154	0,363609	55	65
29	Does the PPF disclose the benefits plan regulation?	Mandatory	0,861538	0,348072	56	65
30	Is there disclosure of the person responsible for the applications of PPF resources?	Mandatory	0,538462	0,502398	35	65
31	Is there disclosure of the custodian of PPF resources?	Voluntary	0,461538	0,502398	30	65
32	Does the PPF provide the semi-annual report on internal controls issued by the audit board?	Mandatory	0,061538	0,242186	4	65

33	Does the PPF provide the conclusive opinion on the financial statements issued annually by the audit board?	Mandatory	0,846154	0,363609	55	65
34	The PPF adopts socio-environmental actions?	Voluntary	0,492308	0,503831	32	65