Brazilian Pension Funds Stability Report

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PREVIC
Superintendência Nacional de
Previdência Complementar

CONTENTS

TEAM

PREFACE

The Brazilian Pension Funds Stability Report (REP) is a semiannual publication of the Brazilian Pension Funds Authority (Previc) that presents the overview of Brazilian's Pension Funds (PF), their recent evolution and perspectives, focusing on the main risks and the measures that are being taken to mitigate them. This edition contains data until September 2018 and aims to provide a prospective risk analysis.

The stability of the pension funds industry is the ability to maintain the funding level, the soundness and the regular functioning of the system, understood as the management of the resources of the participants and the payment of the benefits due.

The REP provides an understanding of the risks from the existing macroeconomic environment, going from general aspects to specific situations. The analysis aims to highlight the liquidity and solvency situation, as well as the profitability, focusing on the inherent risks of management activities of third-party pension resources, all under a prospective approach.

Chapter 1, named "Macroeconomic Environment", contemplates the analysis of the economic situation and its possible effects on the pension funds system. Chapter 2, "Pension Funds System Overview", analyses the system liquidity and solvency, as well as the main risks, with the use of specific indicators and details on the evolution of the technical balance. In addition, under the "Results" section, there is a comparison of each plan's type with market benchmarks, for a profitability analysis.

At the end of this edition, there are also two boxes. The first one refers to the recent implemented and under implementation regulatory changes, that seek to improve the regulatory framework and strengthen the defense lines of the pension funds industry. The second box explains the methodology used to compare plan portfolios with the prospective passive portfolios.

EXECUTIVE SUMMARY

The Pension Funds System showed a significant growth of R$ 8 billion compared to December 2017. Also, until September 2018, the aggregate deficit decreased from R$39 billion to R$33 billion, while the aggregate surplus increased from R$ 21 billion to R$ 23 billion.

The system profitability in the first nine months of the year corresponded to 7.34%, whereas the average reference rate of the liability was 7.23%. In the last 12 months, profitability got to 9.4%, which was higher than the benchmark of 8.4%.

Despite the high volatility of the period both nationally and internationally, considering the truck driver's strike movement and the elections, with the increase in the US interest rates and the commercial tension between the US and China, the system solvency improved due to the perspective of economic recovery, which reflected on the valuation of stocks and federal public bonds.

The international scenario was highlighted by the lethargy of global activities due to tight financial conditions and ongoing commercial tension, mainly related to the protective strategy adopted by the United States at the conduction of their external economic politics, imposing tax barriers onto imports from China.

In addition, there is an increase in US interest rates and the likely continuation of the global economic growth at lower rates. There is clear evidence of deacceleration of the economic activity in developed countries and emerging markets.

In the domestic scenario, the economic indicators shows possibilities of growth. Inflation is stable, the interest rate is at historically low levels, Gross Domestic Product (GDP) variation is positive, even though growth is still moderate. Credit shows signs of growth for 2019, the unemployment rate is decreasing, stocks accrue positively in the year, the country risk (measured by CDS) is reasonable and the companies have low leverage.

The high public indebtedness is the main issue pointed out by the financial market that may affect the pace and sustainability of economic growth.

1

MACROECONOMIC ENVIRONMENT

1.1 International Scenario[1]

Macroeconomic data show that there was a decrease of the world growth cycle, since global activities have slowed down due to tight financial conditions and ongoing commercial tension, mainly related to the protectionist strategy adopted by the United States in its external economic policy and the imposition of tax barriers upon China's imports.

The United States is likely to continue growing, but at decreasing rates and there is evidence of a clear slowdown of the economic activity in developed countries like the Euro zone. In China and in emerging markets due to the weakened international trade and the increase in interest rates, there are also clear signs of deceleration of economic activity given the protective position in several countries, as a response to the currency devaluation and the higher energy costs.

As a result, the world economy has reduced its growth estimation from 3.9% to 3.7% in 2018, 3.5% in 2019 and 3.6% in 2020.

In more advanced economies, growth is expected to be 2.3% in 2018, 2% in 2019 and 1.7% in 2020, and the growth estimations were equally revised downward in the Euro zone, in Japan, and in the United Kingdom. Despite the stability of salaries and the controlled inflation, the decrease in the price of oil and other commodities makes it less optimistic to the performance of these economies.

Regarding countries from emerging markets and from developing economies, the growth expectancy was also revised downward, mostly due to the reduction of commodity prices. Therefore, the aggregate projections for these countries, regarding the last REP, decreased from 4.9% to 4.6% in 2018 and from 5% to 4.5% in 2019.

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1 - Report of the World Economic Outlook Update of the International Monetary Fund (Jan/2019)

1.2 Domestic Scenario

The growth estimation for the GDP for 2018 was reduced to 1.28%, for 2019 considering the level of uncertainty caused by the implementation of reforms and the recovery of the Brazilian economy, the estimated GDP is 2.57%[2].

In prospective terms, the following factors contribute positively to the return of sustainable growth: the historic low interest rate level, the inflation under control, the grain production, the perspective of credit growth, the reduction in unemployment rate, the regained confidence reflected in the positive variation of the stock and on the country risk maintenance (CDS) at reasonable levels, in addition to low leverage in companies and the resumption of household consumption.

Despite the positive environment, resulted from the indicators mentioned above, there is still a need for balancing public accounts, which can damage the economic growth if not dealt with.

Regarding the price level measured by the National Consumer Price Index (IPCA), the inflation in 2018 was 3.75%[3]. The median projections for inflation in 2019, 2020 and 2021 are, respectively, 4.02%, 4% and 3.75%. This scenario stimulated the policy of reducing the basic nominal interest rate of the economy, which currently stands at 6.5% per year[4].

In this context, real short-term rates start to orbit around 3% per year, still not proportionally followed by long-term interest rates, which oscillate above 5%. This discrepancy is of particular interest for the pension funds industry (Graph 1).

Graph 1: Interest Rate Curves
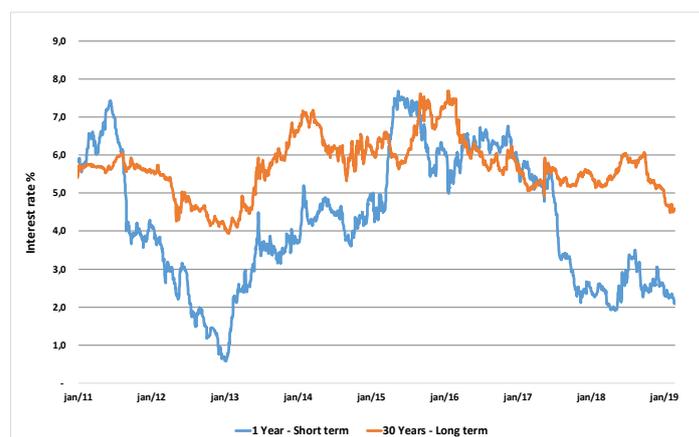
2 - BCB's Market Expectation System (Jan/2019), IBGE Continuous PNAD (Nov/2018). Independent Tax Report (Nov/2018).

3 - Source: IBGE – IPCA https://www.valor.com.by/valor-data/tabela/5800/inflacao

4 - Copom Meeting of December 12, 2018.

2 PENSION FUNDS SYSTEM OVERVIEW

2.1 Introduction

Due to the high predictability of PF's liability projections, the need for liquidity of the assets managed by them is relatively low, especially when compared to other institutional investors, such as banks and investment funds focused on retail activities. It allows all pension funds to allocate resources for longer terms, which may result in higher returns than those obtained by the management that prioritizes investment liquidity.

By issuing this type of assets, it is possible to fund finance investment activities carried out by public and private sectors, which, under the economic perspective, grants higher importance to the industry.

However, the PF selection of investments should not focus only on adjusting in terms of investment and in the levels of profitability. The compatibility of expected returns to the levels of incurred risk should also be taken into account.

The main risks associated with management activities are solvency, liquidity, credit, market, actuarial, legal and operational, the latter being affected by governance issues. Some risks will be assessed in this report under a general perspective of the sector.

2.2 System Overview

2.2.1 Big Numbers

In the first nine months of 2018, the pension funds system displayed an increase in the amount of resources, despite the reduction of the number of entities and plans[5], as shown in Table 1.

Table 1 - PF and Plans – Dec/2017 and Sep/2018

	December / 2017		September / 2018	
Prevailing Sponsorship	**Quantity**	**Total Asset-R$ billion**	**Quantity**	**Total Asset-R$ billion**
Public - Federal	37	437	37	455
Public - States & Municipalities	52	78	52	80
Private	196	319	187	330
Not Sponsored	21	8	21	8
Total	**306**	**842**	**297**	**873**
Type	**Quantity**	**Total Asset-R$ billion**	**Quantity**	**Total Asset-R$ billion**
DB	323	536	316	550
VC	357	193	350	207
DC	428	113	432	116
Total	**1108**	**842**	**1098**	**873**

In September 2018, the 297 PF in Brazil managed R$ 873.5 billion out of 1.098 plans, being 316 Defined Benefit Plans (DB), 350 Variable Contribution Plans (VC - "Mixed DB") and 432 Defined Contribution Plans (CD). In quantitative terms, there was net expansion of only DC-type plans, with the creation of four new plans (Graph 2).

The reduction in the number of entities and plans happened for those sponsored by private sectors. Regarding plan types, there was a decrease in DB and VC-type plans, which went from 680 to 666.

Graph 2: Number of PF & Total Assets
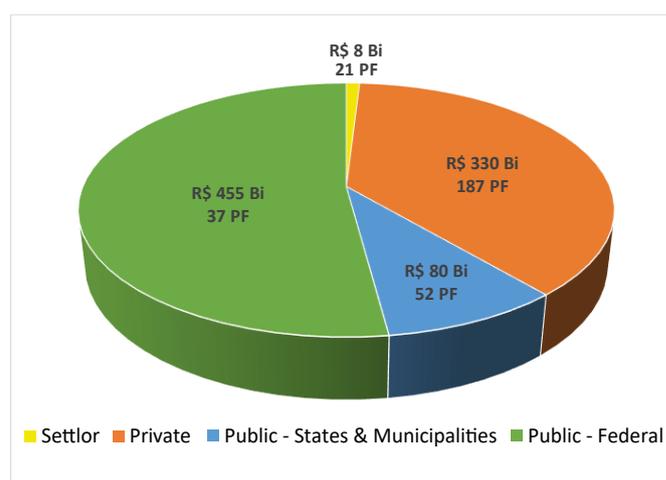
5 - Entities terminated in 2018: Fundação Garoto, Instituto STEA, SanPrev, DarexPrev, BP Prev, Cabea, Arus, Funterra and Banco Sumitomo Mitsui Brasileiro, Sociedade de Previdência Privada.

Regarding the distribution of resources by type of plans, DB plans hold R$ 550 billion, equivalent to 63% of total system assets, followed by VC plans, with R$207 billion, equivalent to 24% of the total, and DC plans with R$115 billion, equivalent to 13% of the total (Graph 3)[6].

According to Normative Instruction nº 5/2017, 17 pension funds are classified as Systemically Important Entities (ESI)[7], because their operations are differentiated from the others in size, relevance and complexity. Overall, the ESI hold 62.5% of total system assets (Graph 4). There was no change regarding ESIs since this classification started in 2017.

Regarding the increase in number of participants, Funpresp-Exe, Funpresp-Jud and PF linked to states and cities governmental bodies stand out, as shown in Table 2.

Graph 3: Types fo Plans

R$ 115 Bi
432 Plans

R$ 207 Bi
350 Plans

R$ 550 Bi
316 Plans

■ Defined Benefit ■ Variable Contribution ■ Defined Contribution
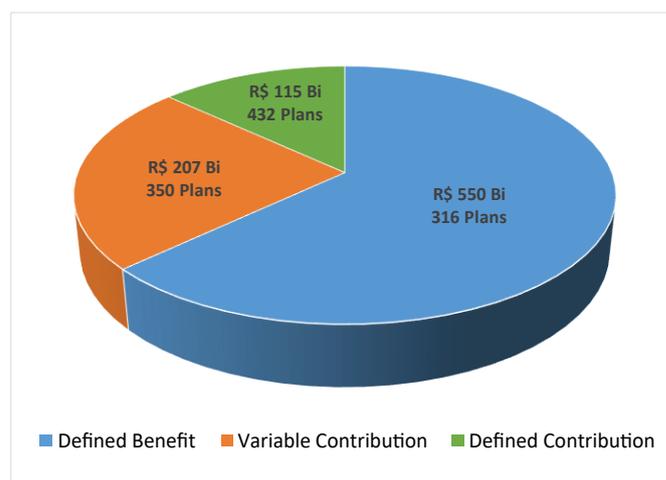
Graph 4: Assets and Ownership

R$ 130 Bi
6 ESI

R$ 28 Bi 3 ESI

R$ 388 Bi
8 ESI

■ Public - Federal ■ Public - States ■ Private
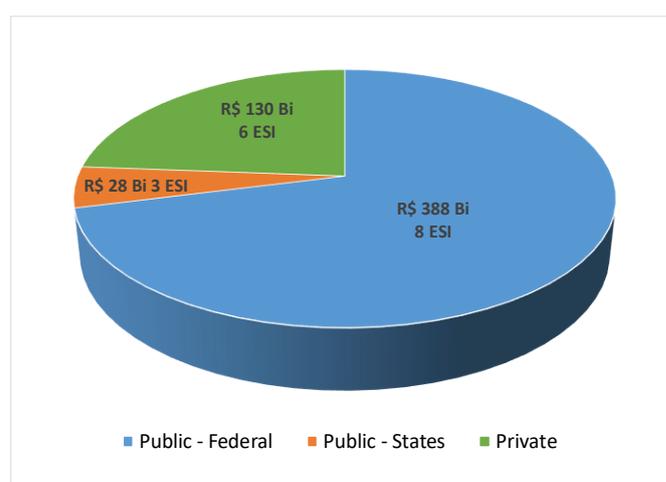
Table 2: PF Sponsored by States

State/Municipality	PF's name	Activities since	EFPC's situation	Plans
São Paulo	SP-PREVCOM	03/23/2012	Operational	3
Rio de Janeiro	RJPREV	09/04/2013	Operational	1
Espírito Santo	PREVES	12/19/2013	Operational	2
Minas Gerais	PREVCOM-MG	09/19/2014	Operational	1
Bahia	PREVBAHIA	03/09/2016	Operational	1
Rio Grande do Sul	RS-PREV	04/26/2016	Operational	1
Santa Cartarina	SCPREV	05/02/2016	Operational	1
Goiás	PREVCOM-GO	04/05/2017	Operational	2
Curitiba-PR	CURITIBAPREV		Authorized	1
Distrito Federal	DF-PREVICOM		Authorized	1
Alagoas			Under analysis	1
Pará			Under analysis	1

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6 - According to the Quarterly Statistic Report - September 2018, available on http://www.previc.com.br/central-de-conteudos/publicacoes/informe-estatistico/informes-de-2017

7 - Ordinance nº 916, of September 24, 2018, disclosed the list of Systemically Important Entities (ESI) for year 2019.

Regarding the system promotion, there is also the opportunity created by Normative Instruction nº 9/2018, which allows the licensing and the functioning of benefit plans that can be offered to individuals related to the original participants of the plans, like associates to legal entities of professionals, members with direct and indirect family bonds, spouses and economically dependent individuals.

2.2.2 Investments

Compared to December 2017, the total assets of the industry increased by 3.75%[8], reaching R$ 873.5 billion. This growth in total assets lower than profitability indicate net output of resources, that means the return from investments are not fully incorporated, since they are used to pay the beneficiaries and these payments are superior to the contributions made by active participants.

According to Graph 5, all types of plans have a major orientation for investments in federal public bonds (TPF) over the last years, reaching 62% of the total portfolio in September 2018, including committed operations.

However there are clear differences among portfolios of DB, DC and VC plans in other classes of assets.

DC and VC plans (Graphs 6 and 7) have more evident investments in private securities, which sums up to 15% and 11% of total investments, and in shares the total amount invested is 7% and 10% of total assets, respectively.

In DB plans (Graph 8), the composition is strongly impacted by high concentrations of variable income investments of the biggest plan in Brazil, which allocates a significant part of the investments (48%) in the stock market. The 6% interest in real estate in DB plans also stands out, which is almost inexistent in other plans. Plans with real estate investments in the portfolio should seek alternatives to comply with Resolution CMN nº 4.661/2018[9].

8 - Growth from R$ 842 billion to R$ 873.5 billion.

9 - Art. 37, §5 Within 12 years from the effective date hereof, the PF shall dispose of real estate and land inventory in their own portfolio or build a FII to store them; the limit set forth in item "e" of paragraph II of art. 28 does not apply hereto.

Graph 5: Portfolio Composition
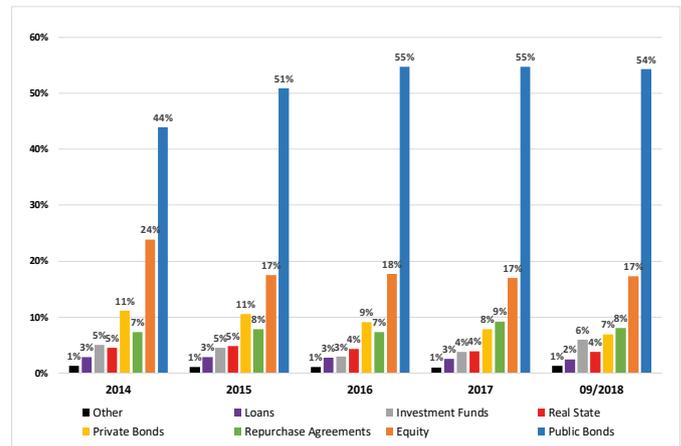
Graph 6: Portfolio Composition – DC plans
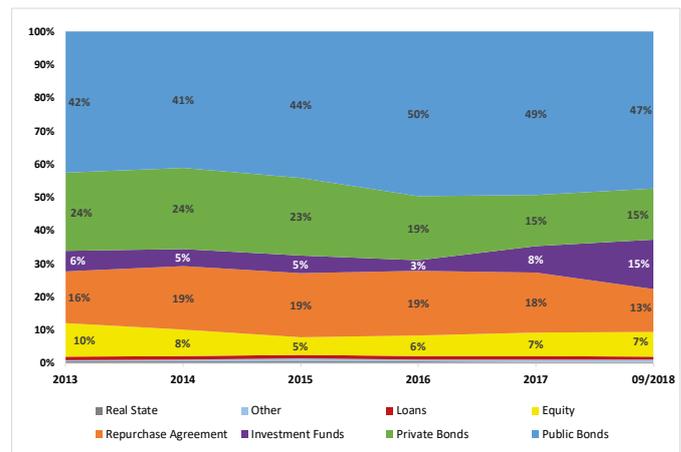
Graph 7: Portfolio Composition – VC plans
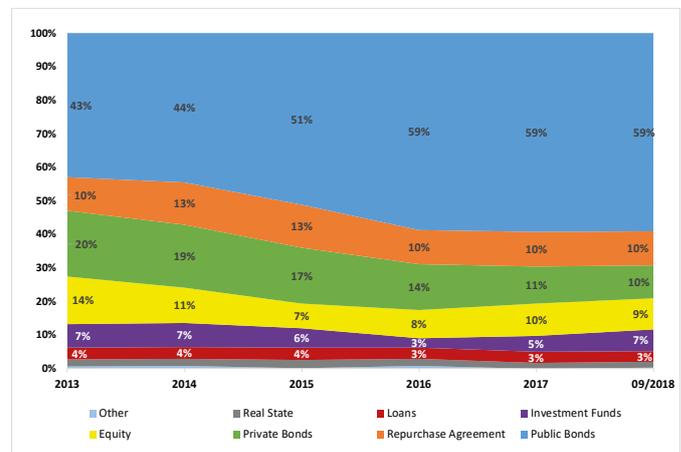
Graph 8: Portfolio Composition – DB plans
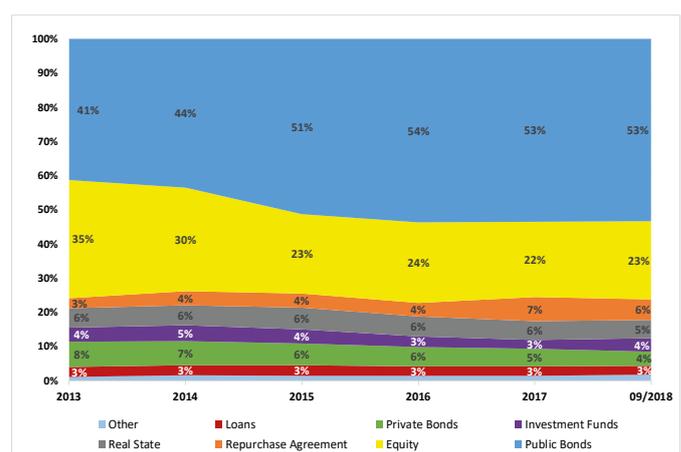
2.3 Solvency

The solvency of the industry improved, as it is shown by the significant reduction in the net aggregate deficit in DB plans from R$18 billion in December 2017 to R$10 billion in September 2018.

The positive dynamics of solvency is the result of the economic recovery perspective, reflected in the valuation of stocks in the first and third quarters of 2018, as well as the return of federal public bonds and, primarily, the ongoing recovery plans, especially those carried out by ESI.

The decrease in the results of benefit plans in the first half of the year is explained by the worsening of the economic environment. The Brazilian economy was strongly influenced both by changes in the international scenario and by the deterioration of internal macroeconomic estimations, mainly due to the strike of the truck drivers in May and the elections, with consequent revisions of national growth rates.

In addition, the particular aspects of the SPCF also delivered a certain degree of uncertainty as to solvency, such as judicial demands of recovery plans

2.3.1 Solvency Index

The solvency index (IS) of the system decreased from 0.97 to 0.94, between December 2017 and June 2018, and grew from 0.94 to 0.98 in the third quarter of 2018.

The average IS close to one results from the reduction of the system's deficits and reveals that the existing resources are sufficient to meet the remaining actuarial obligations in the short and long terms[10]. However, there is a high dispersion of the calculated indices for each pension plan compared to the average of all plans. Therefore, there is still a need for diligence in the recovery plans, some of which are quite significant.

Nevertheless, the analysis of the solvency frequency distribution of plans reveals that the number of DB plans with IS lower than one increased from 102 plans in December 2017 (38%) to 116 in September 2018 (43%). The numbers show that the solvency improvement was concentrated in some plans managed by ESI, with a relevant participation in the total system (Graph 9).

10 - Solvency index slightly below one does not necessarily represent unconformity. The current solvency norm establishes the need for compulsory equations for deficits above a certain limit.

The improvement in solvency for ESI was mainly due to the positive variation of the variable income financial assets in the first and third quarters, especially the plans with the largest volume of shares in the portfolio, as well as the regular income of federal public bonds.

In the period, one ESI showed a significant reduction in the solvency index, with IS being slightly below 0.8 (Graph 10).

Concerning the plans with a critical solvency level, with IS lower than 0.7, there was a decrease from 11 to 9 plans.

As shown in Graph 11, there are few plans with IS lower than the indicated value, and they represent only 1% of the total assets allocated in DB plans. Non-ESI DB plans maintained IS stable for the period. The few that have an IS lower than 0.7 are under constant supervision.

2.3.2 Aggregate Results: deficits and surpluses

Confirming the estimation presented in the last report, the aggregate deficit of the system decreased to R$ 10 billion in the period (Graph 12).

Once the recovery plans implemented in 2017 and the trend of positive results are maintained, aggregate surpluses are expected to outweigh the system's aggregate deficits in 2019.

Graph 9: Solvency Index Distribution
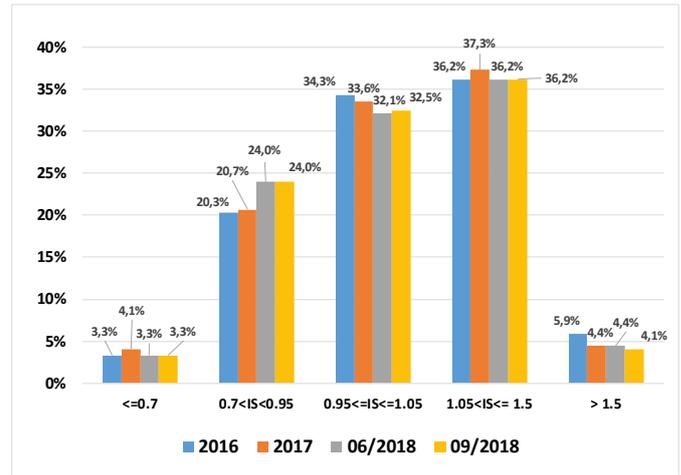
Graph 10 ESI: Solvency Index - DB plans
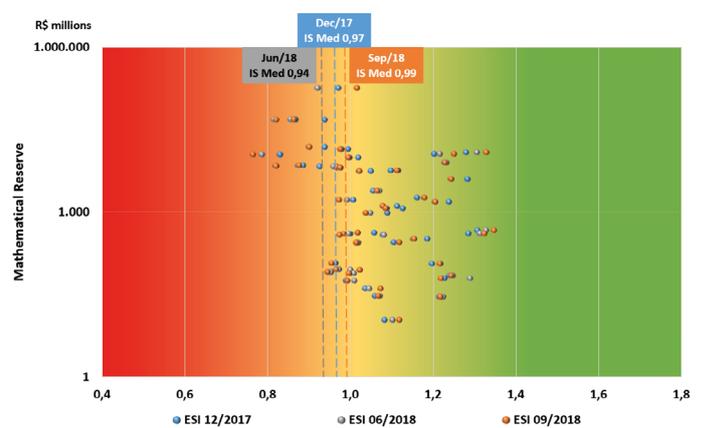
Graph 11 Non-ESI: Solvency Index - DB plans
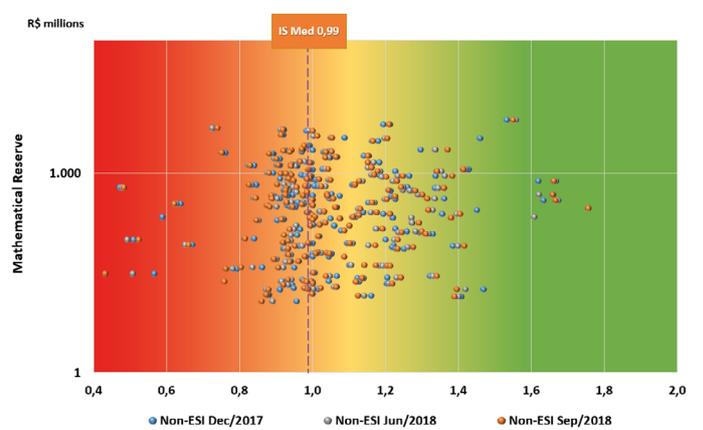
Graph 12: Surpluses and Deficits
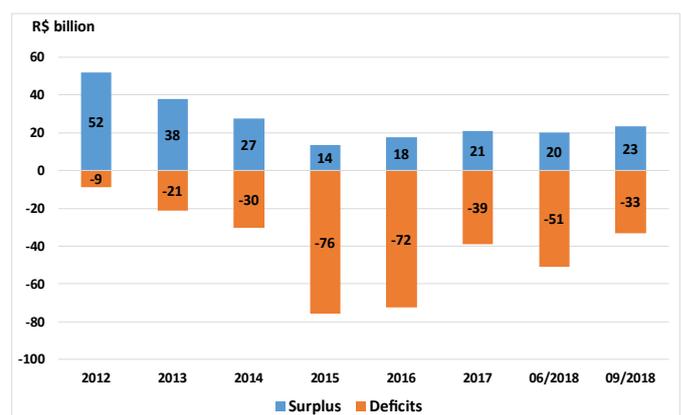
2.3.3 Sponsor's Dependency

The dependency of the ESI on the sponsors[11] has remained at approximately R$ 70 billion since 2015, when it reached its maximum of R$ 88 billion[12].

Relating to non-ESI, there was a gradual decrease in dependency on sponsors, with an approximate reduction of R$ 3 billion in 2017. Between December 2017 and September 2018, the sponsors' debt with the pension funds practically did not change (Graph 13).

In terms of accumulated deficits with potential recovery plans, there was a significant reduction in the ESI group, which summed up to R$ 7 billion in September 2018 (Graph 14).

Non-ESI, on the other hand, presented insignificant deficits (Graph 15).

Regarding total assets, the average percentage of sponsor's dependency remained close to 10% in September 2018.

The segmented analysis between ESI and non-ESI gives opportunity to verify a significant difference between averages since 2015, and in September 2018; the average sponsor's dependency reached 13%, while the average of non-ESI reached 4% (Graph 16).

Such high sponsor's dependency represents an additional risk to the viability of the benefit plans, especially when the sponsor's economic and financial situation are fragile.

Besides, it is important to mention there is a reduction in the volume of available resources, since the debts contracted by the sponsors represent amounts settled at the rates that correspond to the actuarial targets for a long period. Thus, the greater the sponsor's dependency, the lower the availability of resources actively managed by the PF.

Graph 13: Sponsored Dependency
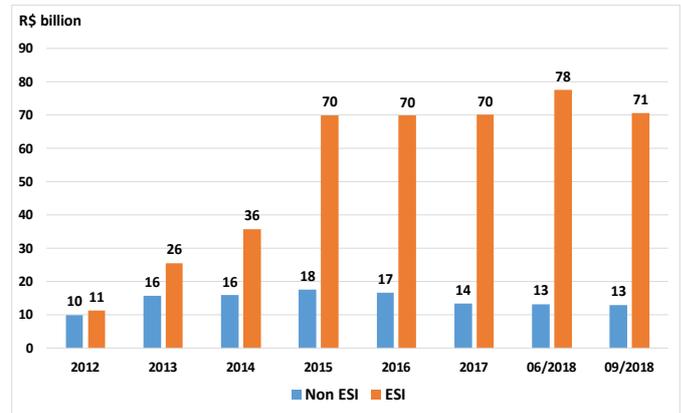
Graph 14: Sponsored Dependency - ESI
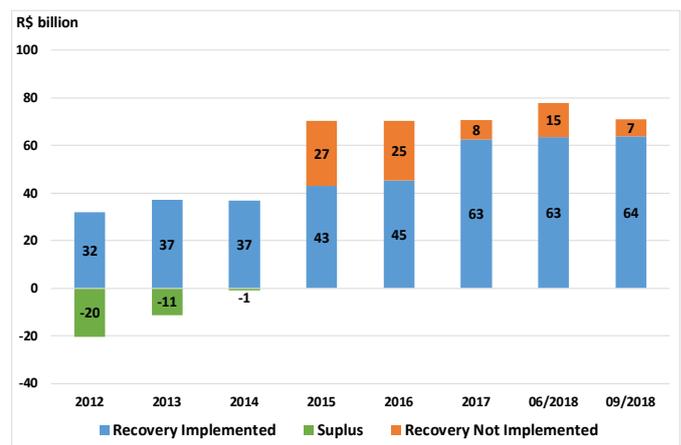
Graph 15: Sponsored Dependency - Non-ESI
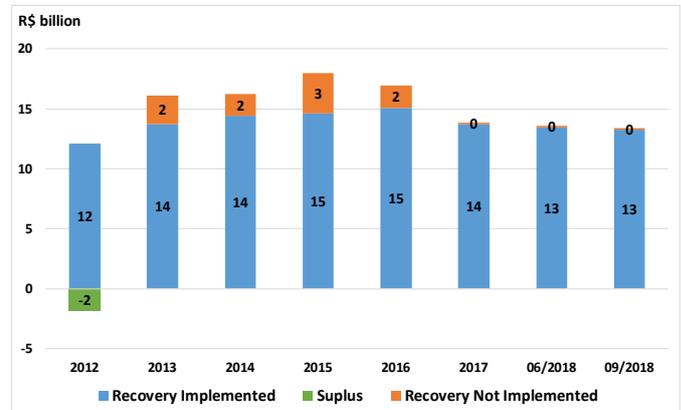
Graph 16: Sponsored Dependency to Total Assets
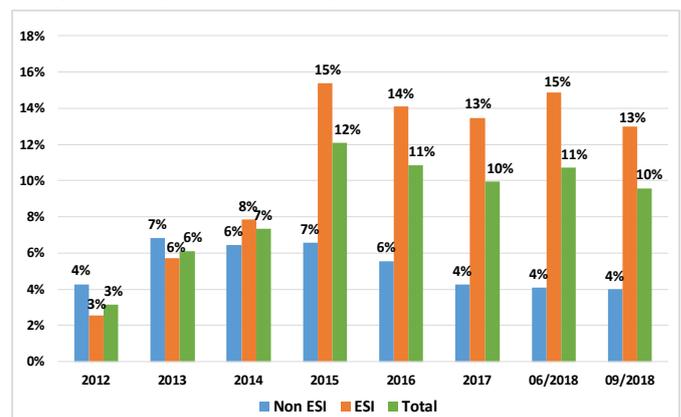
11 - Dependence on the sponsor is expressed by the sum of the hired debt, the past due contributions, past services – contributions to be made, equaled deficits, recoveries to extraordinary contributions and 50% of the accrued deficit.

12 - In June 2017, the sponsor's dependency was at R$ 88 billion

2.4 Liquidity Risk

The liquidity risk of the system remains low. The system holds assets that are eligible to meet its obligations in the short and medium term.

PF plans with a long-term liquidity index (ILA) below one are under supervision in order to adopt corrective measures.

The liquidity risk analysis of the benefit plans also includes the assessment of potential financial losses arising from the realization of assets at prices below those practiced in the market to comply with short-term payment obligations.

For the purpose of measuring and analyzing the liquidity risk with a more detailed look, there are three indicators: Long-term Liquidity Index (ILA), Short-Term Liquidity Index (ILR), and Duration Gap (DD)[13].

2.4.1 Long-term Liquidity Index

The Long-term Liquidity Index (ILA) measures the availability of liquid assets, regardless of their maturity or volatility, to meet obligations with participants projected for five years.

The average ILA[14] calculated in September 2018 was 2.27, slightly lower than the ILA of 2.39 in December 2017. Considering only the DB plans managed by ESI, the average index was 2.10 in September 2018.

At this level, above two, the liquidity of the system remains quite comfortable (Graph 17).

Therefore, on average, net assets exceed by more than twice the cash requirement to meet the obligations with the participants (benefits payments).

Graph 17: Long-term Liquidity Index - DB plans

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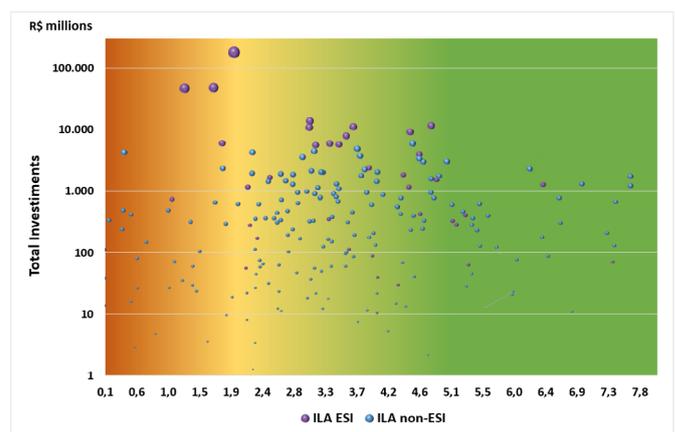
13 - Calculated based on the system's consolidated values

14 - Calculated based on the system's consolidated values

2.4.2 Short-term Liquidity Index

The Short-Term Liquidity Index (ILR) considers only fixed-income rate flows in relation to the actuarial liabilities up to five years.

The consolidated ILR for all DB plans was 1.08 in September 2018, while the DB plans managed by ESI was 0.92.

The ILR lower than one, found in some benefit plans (Graph 18), suggests the need to realize pre-maturity fixed income assets or other assets to meet cash requirements for the next five years[15].

On the other hand, based on the premise that the plan is adjusted, the ILR much higher than one may indicate liquidity excess and consequent risk of reinvestment.

2.4.3 Duration Gap

The duration gap among assets and liabilities reflects the mismatch between the average maturities of fixed income inflows (including coupons and amortization) and the flows of benefit payments net of contributions from members already receiving benefits.

The liability duration of all DB plans was calculated at 11.29, using 5.32% per year as discount rate[16]. Regarding the DB plans managed by ESI, the duration of the liability was 11.36[17]. The average duration found reflects the maturity of DB plans.

Graph18: Short-term Liquidity Index -DB plans

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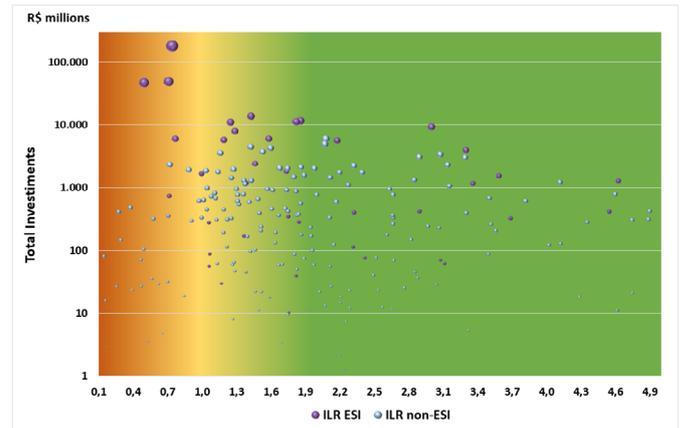
15 - The obligation to sell shares, imposed by actuarial commitments, tends to expose the plan to higher market risk, to the extent that it needs to be concluded under adverse market conditions, that is, at lower prices

16 - All aggregate actuarial taxes are calculated based on information from the Actuarial Statements of December 31, 2017, by means of actuarial rates of groups of plans weighted by the respective mathematical provisions of DB plans.

17 - Using 5.31% per year as discount rate

In the period, there was an increase in negative mismatching, when the liability duration is higher than the assets duration, specifically fixed income investments. The amount of plans with a mismatch over six years increased from 68 to 86 plans between December 2017 and September 2018, totaling R$ 42.2 billion in assets. In the ESI group, there are ten plans in this situation, which totaled R$ 21.3 billion in assets (Table 3).

Table 3: Time Gap Between Assets and Liabilities

Years Gap	AGGREGATED[18]		ESI	
	Nº Plans	Amount (R$ billion)	Nº plans	Amount (R$ billion)
<-9	46	10,3	3	1,8
>=-9 e <-6	40	31,9	7	19,5
>=-6 e <-3	66	64,0	8	21,3
>=-3 e <0	86	343,3	18	306,0
>=0 e <3	48	50,8	11	30,9
>=3 e <6	10	2,6	3	0,3
>=6	15	8,2	2	6,8

18 - Data used to estimate duration mismatch related to 5 DB plans is unavaible.

2.5 Credit Risk

The analysis of potential losses of financial assets incorporated information from the Central Risk System managed by the Central Bank of Brazil (SCR).

Credit risk remains systemically irrelevant, with no signs of deterioration in credit quality in the period. However, there are plans with higher levels of expected loss (PE) and aggravated expected loss (PEA), which suggest weaknesses in the analysis process and investments in private credit assets, deficiencies in credit risk management or, in isolated cases, events of fraud[19], which led to provisions for that purpose.

The credit risk assessment was based on the PE calculation of the portfolio by estimating the probability of default (PD) of the private securities, inferred from the credit risk ratings of the issuers made by risk rating agencies and SCRs.

For assets with no assessment available, around 10% of total private securities held by the benefit plans, a discretionary method was adopted to assign value to PD. The PE of the securities assessed added to the loss of securities without available assessment, is referred to as PEA.

According to Graph 19, the data show that the risk of PE in relation to the total of private securities assessed (TPA) remains low.

The PEA in relation to the total private securities reaches 1.87% in the average for unrated companies and financial institutions, totaling R$ 36.6 billion.

The analysis of the SCR data identified 43 companies in need for a provision of more than 30%, totaling R$ 358.2 million, equivalent to 1.7% of the total (Tables 4 and 5).

Graph 19: Expected Loss (PE)

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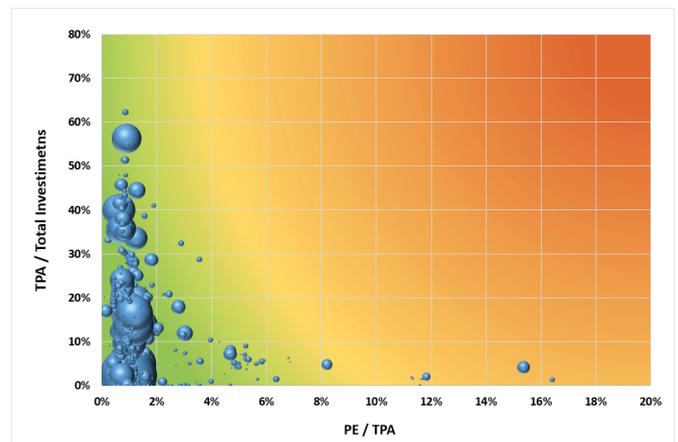
19 - The identified cases are under investigation by the pertinent bodies.

Table 4: Expected loss (SCR based)

R$ millions

Exposure to unrated issuers in SCR		Exposure to rated issuers in SCR	
Number of issuers	Exposure value	Number of issuers	Exposure value
73	3.925,2	191	21.099,3
28%	16%	72%	84%

Table 5: Distribuição Rating SCR

R$ millions

100% Prov.		99% a 30% Prov.		30% a 10% Prov.		10% a 1% Prov.		< 1% Prov.	
Number of issuers	Exposure value	Number of issuers	Exposure value	Number of issuers	Exposure value	Number of issuers	Exposure value	Number of issuers	Exposure value
26	244,1	15	114,1	2	46,1	29	3.133,5	119	17.561,6
14%	1,2%	8%	0,5%	1%	0,2%	15%	14,9%	62%	83,2%

Considering the low participation of private credit securities in relation to total investments, the expected losses, even when aggravated, are insignificant[20].

However, isolated cases of plans with aggravated expected losses, accounting for more than 30% of the private securities portfolio (Graph 20). These specific cases are monitored closely by the supervisory team.

Graph 20 : Aggravated Expected Loss (PEA)

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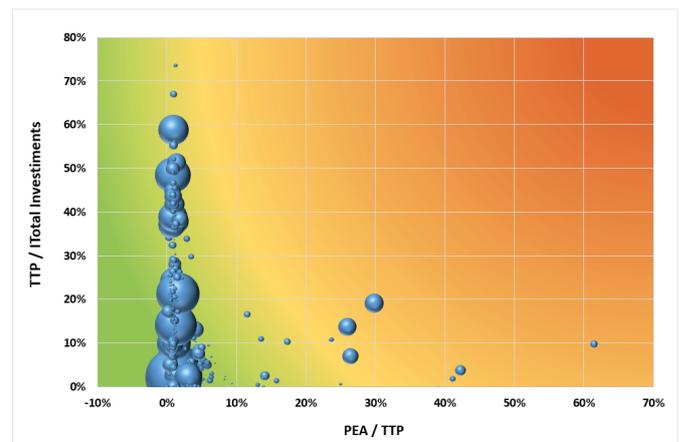
20 - Close to 0.12% of total investments

2.6 Actuarial risk: interest rates

The reference legal limits to be disclosed by Previc as parameter interest rates for actuarial discount rates for 2020 reflect the new calculation methodology established by CNPC Resolution nº 30/2018.

Extending the period to five years in the calculation of the parameter rate will smooth the impact of the reduction in the real interest rate of the economy. In this condition, the upper legal rate limit in periods longer than ten years is projected to be 6.32%, slightly lower than the calculated value for 2018 of 6.36% (Graph 21).

Graph 21: Actuarial Risk: Interest Rate
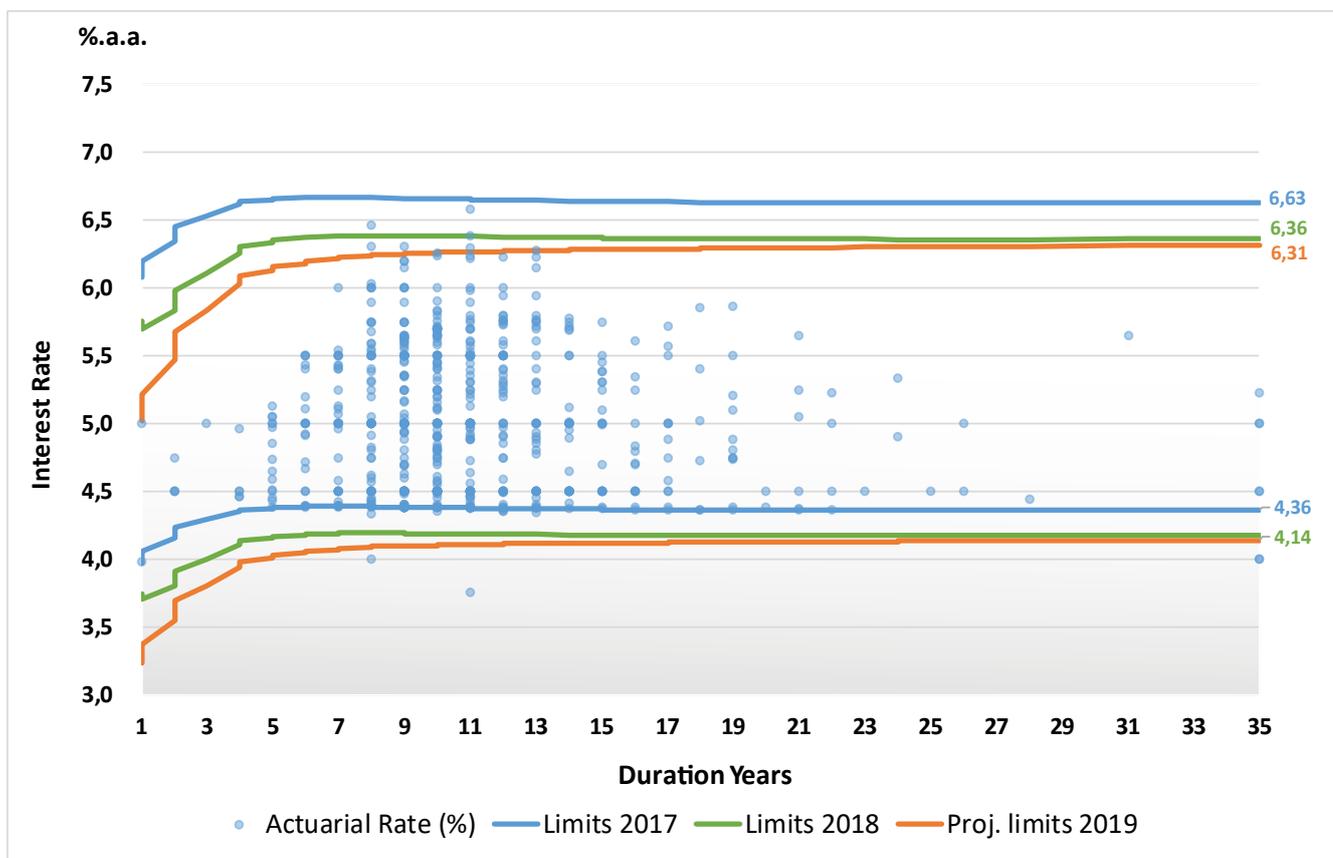
In 2017, the average actuarial rate of the DB plans was 5.32% per year. For the ESI and non-ESI groups, the DB plans demonstrated an average actuarial rate of 5.31% and 5.36% per year, respectively.

However, despite the expectation of a reduction in the Selic interest rate, the long-term rates have not been decreasing in the same intensity. Based on 2017[21] actuarial interest rates, 11 plans would be out of the interval projected for 2019.

21 - Actuarial Statements of 12/31/2017

Considering that the average actuarial rate of the system is 5.32%, much higher than the current real interest rates of public bonds[22], adjustments may need to be made in the upcoming years to reflect the interest rates reduction scenario, if these interest rates continue to be in low levels.

In this regard, the process of reducing the interest rates for benefit plans should reflect the expected profitability of the assets, estimated by investments PF professionals. Realistic scenario should be considered in the definition of the actuarial target, based on the technical evaluation of the actuary.

Adjustments are expected to occur in the actuarial interest rates in the short and medium terms, observing the new level of interest rates of the economy, with consequent effects on actuarial obligations.

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22 - As reference, take a vortex of 10 years of ETTJ of actual interest calculated by Anbima, 4.93% per year, on 12/18/2018

2.7 Results

The managers of the PF act in the allocation of resources to maximize returns at certain risk levels, and provide at least for mutual plans, the reach of the defined actuarial targets that will guarantee the payment of present and future obligations.

2.7.1 Profitability Evolution

The system's profitability showed satisfactory performance until September 2018 when compared to the average reference rate for liabilities, formed by the INPC + 5.32% per year. The average yield of the system in the first nine months of 2018 was 7.34%, for a reference liability rate of 7.23%.

The ESI obtained an average profitability of 8.31%, surpassing, therefore, the average reference rate. Non-ESI, in turn, ended the month of September with an average yield of 5.88%.

When plans are separated by their types and by the ESI and non-ESI classification, the outlook shown in Table 6 is obtained.

However, profitability above INPC + 5.32% in 2018 was not enough to cover the negative results observed especially between 2013 and 2015 (Graph 22).

In relation to the financial performance of the ESI, the good results obtained with investments in variable income, arising from investments directly allocated to the stock markets (own portfolios) as well as those carried out through stock funds were responsible for their profitability achieved at the end of the cycle ending in the third quarter of 2018 (Graph 23).

However, the variable income investment, which is highly representative in the portfolio composition of a few ESI, does not have the same relevance in other ESI and non-ESI.

Table 6: Profitability in 2018

Type	ESI	non-ESI	Total
BD	8.91%	7.30%	8.49%
CD	5.90%	4.67%	4.88%
CV	6.56%	5.29%	5.89%
Total	8.31%	5.88%	7.34%

Graph 22: Profitability vs Average Actuarial Rate
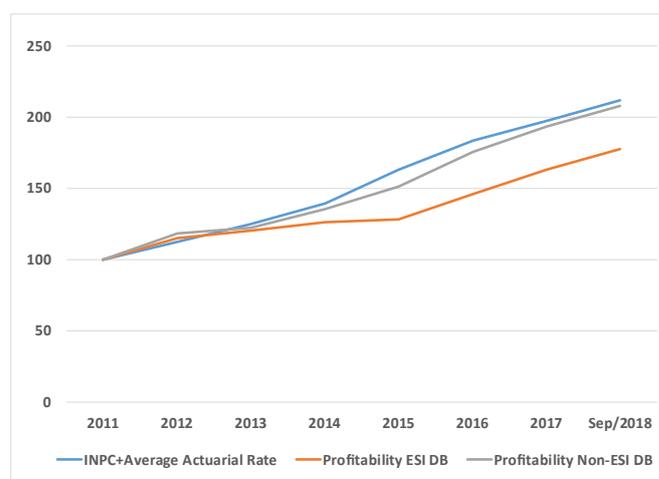
Graph 23: Profitability by Assets - ESI until Sep/2018[23]

* The values on the labels refer to allocation weight and the accumulated profitability up to September 2018

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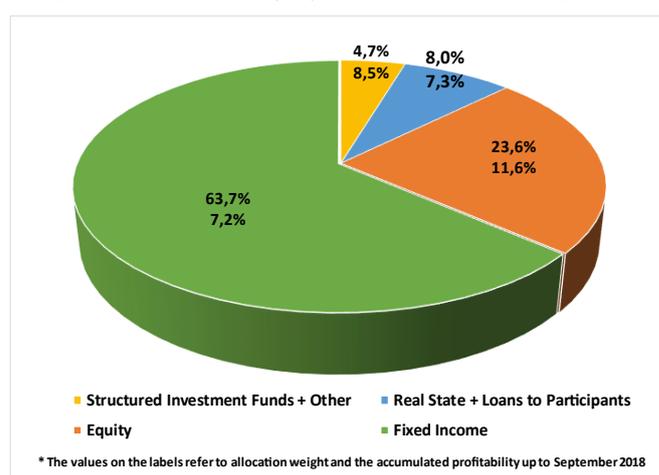
23 - additional subtitle of graphics 23 e 24: Fixed income = public bonds, private bonds + fixed income funds; Equity = stocks + equity funds ; Other investment funds = investment fund in loans (FIDC) + Investment Fund in Finance Projects (não seria melhor private equitiy investment funds?) (FIP) + multimarket investment funds (FIM) + other investment funds; Real state = private real state + participant loans, real state funds (FII) (REIT, REOC and MBS), loans to pension funds participants

Excluding the PF with the highest stock allocation, the average profitability of this class of asset reached 6.4% in the period ending in September 2018. If only the one DB plan of the same PF were excluded, the average profitability of the DB plans would be 6.35 %.

Regarding non-ESI, both the participation of variable income investments and the average profitability were significantly lower in the period ending in September, reaching 6% and 2.8%, respectively. Still concerning the non-ESI, 90% of total investments are represented by fixed income operations and investment funds, which obtained very similar returns of around 6%, crucial for the reaching of an average level of profitability at 5.88% in the period finishing at the end of the third quarter of 2018 (Graph 24).

The historical profitability evolution of the benefit plans shows that the average profitability for 2018 is expected to be close to the general average of the last seven years (10%). The segregated analysis by type of plan shows that the profitability of DB plans in 2018 tends to be higher than its average of the last seven years[24], whereas VC and DC plans tend to present average returns in 2018 below historical averages (Graph 25).

2.7.2 Investment Performance Analysis

The performance analysis of portfolio management usually compares the returns obtained to a benchmark. However, the investment allocation strategies of the plans are quite heterogeneous, which would make the use of a single benchmark inappropriate.

Although the DB plans have a reference rate for the specific profitability per plan represented by the actuarial rate, the evaluation of short-term performance based on this rate may lead to misjudgments. The actuarial rate is an average rate that incorporates expectations of short and long-term profitabilities, which may differ significantly from the current level of interest rates and returns obtained in the short term.

In this sense, the Investment Management Performance Index (IPGI) was developed with the objective of measuring the performance of the investment management compared to what would be obtained with a passive management.

Graph 24: Profitability by Assets – Non-ESI

- Structured Investment Funds + Other
- Real State + Loans to Participants
- Equity
- Fixed Income

* The values on the labels refer to allocation weight and the accumulated profitability up to September 2018
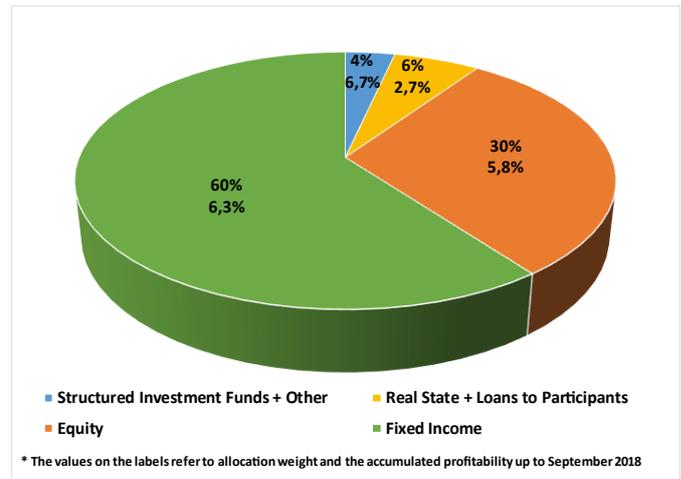
Gráfico 25: Historical Profitability

24 - The DB plan's average profitability is significantly affected by the highest DB plan in the Country, with an increased concentration in shares.
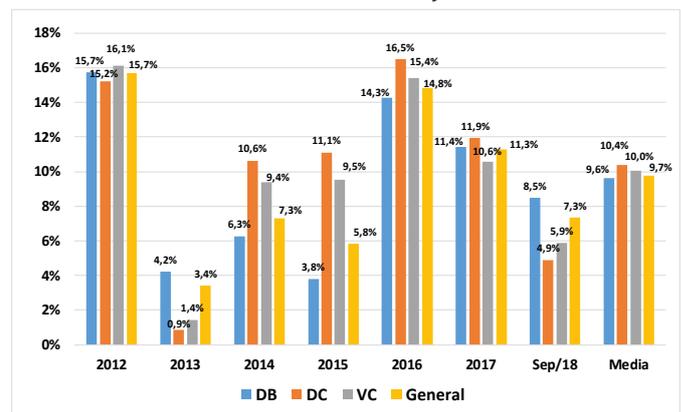
The metric shows the difference between the profitability of the plan and its benchmark, which is defined by a theoretical portfolio of indexes whose composition reflects the allocation in asset classes of investment portfolios[25].

When constructing the benchmarks, the assets of the plans were associated with market indices, which represent the profitability of asset classes[26], according to the predominant risk factor. After this process, weights were assigned to the indexes according to the composition of the theoretical portfolio of the plan[27] in each month.

As an example, Graph 26 represents the average composition of the benchmark calculated for the aggregate portfolio of the system. In accumulated terms, the benchmark variation for the aggregate portfolio in the period was 45.6% (12.58% per year), while the system profitability was 35.7% (10.13% per year).

Graph 27 shows the distribution of the IPGI calculated for the accumulated 12-month period since September 2015. Both the number of plans (number indicated above each column) and the representativeness of the plans, measured by the investments value, represent a tendency of improvement in performance over the last three years.

Graph 26: Allocation and Profitability by Factors[28]

* The values on the labels refer to allocation weight and the average annual profitability in the previous 3
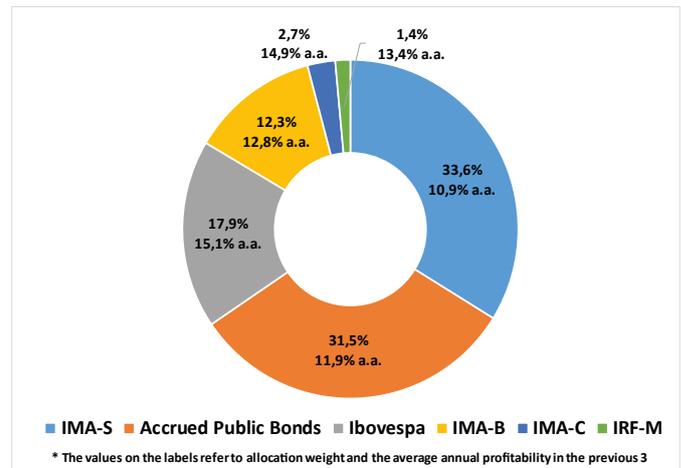
Graph 27: Distribuição das performances

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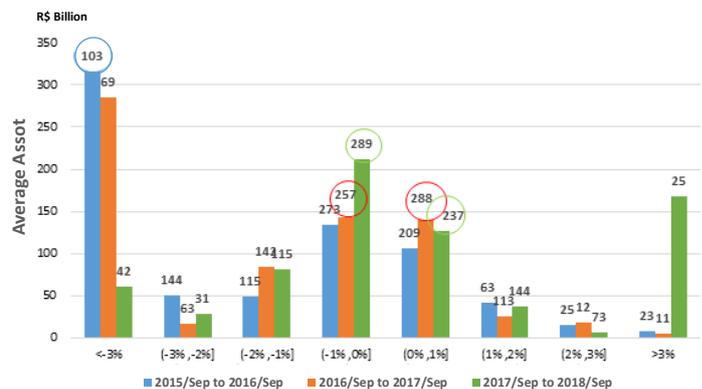
25 - Benchmark is a reference index that seeks to show the performance of the management of plant assets regarding the returns considered "free" of idiosyncratic risks.

26 - The public securities portfolio kept to the maturity is considered an extra class and profitability related to it is the one obtained by the securities portfolio.

27 - The theoretical portfolio seeks to reflect the real portfolio with assumption of premises to allow calculations

28 - IMA (ANBIMA Market Index) is a family of indexes representing the evolution, at market prices, of a public bond portfolio, used by the segment as a benchmark. The IMA is subdivided into four sub-indexes: IRF-M (fixed rate bonds), IMA-B (linked to IPCA inflation rate), IMA-C (linked to IGP-M inflation rate) e IMA-S (floating bonds linked to SELIC rate)

2.8 Final Remarks

Credibility is a determining factor for the sustainability of the pension fund system, in addition to the elements of risk and solvency. The adoption of regulatory and supervisory measures is necessary for the resolution of historical issues and the maintenance of soundness, reducing possible market vulnerabilities and actuarial liabilities.

In this sense, Previc has been committed to improving existing regulations by drafting proposals for changes in legislation and regulation, either through regulatory bodies or through the publication of normative instructions detailing aspects of governance, internal controls, risk management, transparency, accounting, actuarial rules and asset segregation[29].

Notwithstanding the significant infralegal regulatory developments observed in recent years, there is a perception that cultural changes and the proper implementation of good practices will depend on the efforts of each PF. The internalization of the changes will be decisive for the improvement of the quality of the provision of pension services.

Despite the low risk of liquidity and solvency in the short term, even in an environment of greater volatility, the economic scenario will be more challenging for pension fund managers. The PF managers will have to be responsible to revisit the risk balance in the investment decisions and monitor the dynamics of the actuarial assumptions, implementing adjustments in time.

In this context, the increase in longevity can have a significant impact on the sector in the low real interest rate scenario, especially regarding the adequate evaluation of the mortality assumptions associated with defined benefit plans.

The ongoing recovery plan, implemented in some ESI, are equally relevant to long-term solvency. The amount and speed of implementation of recovery plans are essential to the recovery of the technical balance and the restoration of trust. Possible obstacles to the fulfillment of settled recovery plans can make the continuity of plans unfeasible, occasionally leading to more intrusive supervisory actions.

Finally, based on the risk balance presented, the governance bodies must diligently evaluate the need to make adjustments to the plans in order to reconcile the return on assets to liabilities. This dynamic, among other measures, may include a combination of actions such as re-evaluation of composition and risk appetite in the management of investments, adjustments in annual contributions required or revision of the rules for granting benefits, always considering the nature and maturity of plans.

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29 - Resolution that provides for the CNPJ per plan, recently approved by CNPC

box 1 Regulatory Improvements

1.1 Resolution CNPC nº 30, of November 30, 2018

The National Council for Pension Funds (CNPC) and Previc updated the actuarial rules and procedures for private pension plans, in accordance with CNPC Resolution nº 30/2018 and Instruction nº 10/2018.

The measures make the relationship between the supervisory body, PF, sponsors, participants, government and society more agile and transparent, since they consolidate the actuarial rules into a single normative instrument.

CNPC Resolution nº 30/2018 defines the conditions and procedures to be followed by the PF in actuarial valuations, the allocation and use of surpluses and in the calculation of the deficits of the benefit plans, as well as establishing the main minimum parameters applicable to actuarial liabilities.

The Resolution seeks regulatory simplification and provides more clarity in the definition of parameters and technical terms, previously defined in Resolutions CGPC nº 18 and nº 26, aiming to describe more important definitions in its text so that it could be more concise and assertive, reducing the cost of observation for PF and avoiding interpretative ambiguities.

As an example, we can mention: actuarial valuation, interest rate parameter, ETTJ, asset price adjustments, duration of actuarial liabilities, contingency reserve, special reserve, recovery plans, deficit amortization period, destination and use of special reserve (surpluses).

The Resolution was built with the participation of civil society, especially the National Actuarial Commission (CNA), which brings together actuaries, academics and professionals who work in the closed private pension market.

The main changes brought about by CNPC Resolution nº 30/2018 summarizes into five major ones, namely:

- the revocation of a 60-day deadline for the implementation of recovery plans after approval of the responsible governance body, setting it at the latest until the beginning of the annual regular contributions;

- set a deadline for submitting a proposal for recovery plans sponsored by public entities (federal, state or municipal) to their respective control and supervisory bodies;

- allow that in addition to the criterion of the individual mathematical reserve, the definition of the proportion to be applied in the recovery plans and destination of surpluses, proportion by groups of participants may also be considered;

- allow the extension of the amortization period for recovery plans up to the end of the expected flow for the payment of benefits, uniquely for plans that are closed for new entrants, provided that the total deficit is recovered, updated and the PF presents a liquidity and solvency study; and

- increase from three to five years the daily ETTJ for the calculation of the Average ETTJ that will be used as interest rate parameters that will establish the interval in which the benefit plans can adopt the rate indicated in their adequacy study, without the need for prior authorization by Previc.

Instruction nº 10/2018, in turn, details the new Resolution operationally and consolidates Previc Instructions nº 19/2015, nº 23/2015, nº 26/2016 and nº 32/2016, bringing criteria and parameters that should be adopted by the PF for the elaboration of annual contributions, deficit calculation and surpluses distribution. The Instruction also defines procedures for other actuarial matters, such as the calculation of the duration of the liability, the parameter interest rate and the asset pricing adjustments. It also deals with the technical studies to be elaborated by the PF to prove the adequacy of the actuarial assumptions adopted in the plans, as well as establishes a minimum parameter for the projection of the longevity of the participants.

Some innovations brought by the new instruction relate to the definition of relevant facts that require new actuarial valuations besides the annual regular one, it defines the date in which the valuation must be positioned, it also defines the number of decimals to the calculation of the duration of the liability and rounding rules for its use in the application of the Average ETTJ.

Other adjustments that should be mentioned are the biometric tables adopted in the benefits plan, the mortality tables used as the minimum parameter become those of the "basics" category, the minimum actuarial reserves must be calculated with the parameter and compared with the table adopted in the benefit plan. The rule of uniformity of aggravation of mortality rates was excluded, in the case of a mortality table resulting from aggravation or reduction, since there was an interpretation that the previous regulatory instrument did not allow the adoption of more modern techniques like improvements[30].

Finally, it is possible to incorporate into the recovery plans in course new negative results, provided that the remaining period for amortization of the debt is equal to or less than the maximum amortization period.

1.2 Normative Instruction on Governance

Previc provided Public Consultation nº 5/2018 which deals with the detailed principles, rules and practices of governance, management and internal controls to be observed by the PF, in order to ensure full compliance with Resolution CGPC nº 13/2004, in the manner established by its article 24.

The proposal is derived from CGPC Resolution nº 13/2004 and had as reference Law nº 6,404/1976 (Brazilian Corporate Law), the IBGC Code of Best Corporate Governance Practices, the Guide to Best Corporate Governance Practices published by Previc, the PF statutes and the experience of Previ itself in supervisory actions focused on governance.

In particular, the contributions of the IBGC and Abrapp, which provided comments and valuable suggestions for the preparation of the draft presented here, stand out.

The purpose of the instruction is to establish more objective and direct rules, assigning greater applicability of the current rules of governance by the supervision, always in the search of the improvement of the governance in the PF.

The draft describes the principles to be adopted, the rules and practices of governance, management and internal controls appropriate to the size, complexity and risks inherent in the benefit plans managed by them, in order to ensure full compliance with the goals.

The governance principles to be observed permanently by all PF management and supervisory bodies emphasize the protection of the rights of the participants, the interests of the PF and participants, the transparency, clarity and timeliness of the information to be provided on the benefit plans and the accountability of managers.

The draft also spells out the responsibility of the statutory members, the governance structure and the attributions of each of the statutory bodies, the decision-making process and the configuration of conflict of interests.

The deadline for submitting the suggestions is February 11th, 2019.

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30 - Term used to refer to the improvement in life expectancy. This is a form of projection of the mortality table that considers the increase in life expectancy, allowing the incorporation of the effects of this expectation in the actuarial calculation.

1.3 Normative Instruction on Transparence

Previc provided Public Consultation nº 6/2018, which deals with proposals for the improvement of the procedures carried out by the PF in the dissemination of information to the participants and beneficiaries, considering the provisions in article 14 of CGPC Resolution nº 23/2006.

The initiative is part of the "Transparence of Information Project", inserted in the action "Improve rules of transparency and disclosure of information" of the Previc Action Plan 2018-2019.

In this sense, the proposal presents guidelines for the active transparency of information by PF, regardless of requests, observing the legal secrecy and the inherent confidentiality of some information, with the incentive to use communication channels enabled by information technology, including PF to make its own websites available in line with international corporate governance practices in order to enable better social control and self-regulation.

The draft instruction highlights the disclosure of information regarding the regulations and operation of PF, the constitution of its benefit plans, investments and expenses, as well as the individual situation of each participant, which is more restricted. In addition, it determines more objective procedures for displaying information to participants and beneficiaries upon request (passive information).

The draft defines in greater detail and in a standardized way the disclosure of the information on investment management of the PF, seeking to align with the transparency standard established by the Brazilian Securities and Exchange Commission (CVM) for investment funds, and expenses per benefit plan, specifying groups of expenses and indicators, enhancing the comparability between management information for the PK market.

After the consultation deadline, established on February 11, 2019, the standards will be elaborated with the consolidation and analysis of the contributions sent so that the necessary regulatory improvements can be made and the instruction can be published.

1.4 CNPJ per Plan

The CNPC, at its last general meeting in 2018, unanimously approved the proposed resolution presented by Previc for the creation of a registration in the National Registry of Legal Entities (CNPJ) for each benefit plan, covering all legal and administrative functions and taxation[31].

The implementation of the CNPJ by plan reinforces the segregation and independence of the assests of the pension plans and will contribute to the promotion of the system as a whole. The measure brings important protection to legal risks and allows the PF to grow solidly, bringing comfort to all actors in the system, whether participants, PF, managers and sponsors.

The standard is in line with the recent changes promoted by CMN Resolution nº 4,661/2018, which, based on the guidelines for investments of resources, predicted the individualized register of financial assets in custody systems for benefit plans. The new resolution will establish a maximum period of three years, until December 31, 2021, for PF to adapt to the new rule.

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31 - CNPC Resolution nº 31/2018

box 2 Methodology of Performance Indicators

In order to measure performance in the management of the investments of the PF system, the Performance Indicator in Investment Management (IPGI) was developed.

Description:

The indicator describes the difference between the average annual profitability and a benchmark, individually calculated for each plan by Previc, based on the macro allocation strategy of the plan.

This benchmark represents, in fact, a hypothetical portfolio of market indexes, updated monthly according to the change of allocation in asset classes. The market indices representing the asset classes are defined according to the predominance of the risk factor to which the assets are exposed.

There are two exceptions to the rule. The first one refers to the more exotic assets whose association with market indices is not appropriate or difficult to execute, due to the lack of knowledge of the predominant risk factor of the asset, the inexistence of an index that represents the factor or simply the simplification of the model. In this case, an index representing the nominal interest rate is used. The choice of this "risk free" index is based on the assumption that any other asset that contains an additional risk component must overcome it in the long term, consisting a minimum level of profitability.

The second one is related to the portion of public bonds classified as held to maturity. As it is not associated with any index, it uses the rate of return of the own portfolio of public bonds held to maturity.

The data used come from the Investment Statement (DI) of the reference date of the index, the financial statements and market index information.

Calculation Method:

$$IPGI = RentMedia — Benchmark$$

$$RentMedia = \left\{ \prod_{t=1}^{n} \left[1 + \frac{RP_t - RN_t}{\frac{(A_t - P_t) + (A_{t-1} - P_{t-1}) - (RP_t - RN_t)}{2}} \right] \right\}^{\left(\frac{12}{n}\right)} - 1$$

e

$$Benchmark = \left\{ \prod_{t=1}^{n} \left[\sum_{j} (aIndice_{jt}.\, rIndice_{jt}) + aCurva_t.\, rCurva_t \right] \right\}^{\left(\frac{12}{n}\right)} - 1$$

Whereas:

$$\sum_{j} (aIndice_{jt}) + aCurva_t = 1$$

Where:

- aIndex$_{jt}$ is the percentage considered for weighting the return of the jth index in the tth month. To estimate this value, the percentage of the portfolio of the plan in each month that would be subject to the risk factor that the benchmark represents is evaluated. For example, shares may be associated with Ibovespa or IBRX. The indexes currently considered are IMA-B, IMA-C, IMA-S, IFR-M and Ibovespa, however, both the set of indicators and the logic with which the portfolio assets can be associated to the indices;

- rindex$_{jt}$ is the monthly return of the jth index in the tth month;

- aCurve$_{jt}$ percentage of NTN-B, NTN-C, NTN-F and LTN, classified as held-to-maturity in the ith month (other possible public bonds held-to-maturity are associated with the IMA-S);

- Average rCurve$_t$ of the monthly return rates of the held-to-maturity bonds weighted by the amount invested (NTN-B and NTN-C are accumulated with the IPCA and IGP-M respectively);

- RP$_t$ positive returns in the tth month, plan account 5100000000;

- RN$_t$ negative returns in the tth month, plan account 5200000000;

- The final balance of the investments in the tth month, plan account 1230000000;

- The final balance of the operational liabilities of the investments in the tth month (2130000000);

- n is the number of months in the analyzed period.

Interpretation:

The indicator measures the performance of management, respecting the strategy of allocation of resources in asset classes per plan, by comparing a benchmark calculated for each plan and the profitability actually earned by the portfolio.

More specifically, the benchmark preserves the strategy of macro allocation of investments in the choice of exposure to risk factors, but assumes that the selection of the assets in these risk factors is made following passive management.

It is therefore assumed that an IPGI above zero means that the active management in the choice of assets that make up the asset class, exceeds on average the performance of the market portfolios, even if it has to eventually incur in greater risks because the indicator does not adjust the return to risk.

List of acronyms and abbreviations

Abrapp	Brazilian Pension Funds Association
Anbima	Brazilian Association of Financial and Capital Market Entities
BCB	Brazilian Central Bank
BNDES	National Bank for Social Economic Development
CGPC	Pension Funds Management Council
CMN	National Monetary Council
CNPC	National Pension Funds Council
COES	Supervision Strategic Committee
CVM	Securities Exchange Commission
DA	Actuarial Statement
DB	Defined Benefit Plan
DC	Defined Contribution Plan
DD	Term Mismatch
DI	Investment Statement
DPAP	Liability Duration and Price Adjustment
ECB	European Central Bank
ESI	Systemically Important Pension Fund
FA	Aggravation Factor
Fed	Federal Reserve – US Central Bank
FIDC	Investment Fund in Loans
FIM	Multimarket Investment Fund
FIP	Investment Fund in Finance Projects
IBGC	Brazilian Institute of Corporate Governance
IBGE	Brazilian Institute of Geography and Statistics
ILA	Long Term Liquidity Index
IMA - B	Anbima Market Index - B
IMA - C	Anbima Market Index - C
IMA - S	Anbima Market Index - S
ILR	Short Term Liquidity Index
INPC	National Index of Prices for Consumers
IPCA	Wholesale Price Index for Consumers
IPGI	Investment Management Performance Index
IS	Solvency Index
LFT	Treasury National Letter
NTN - B	National Treasury Note - series B
NTN - C	National Treasury Note - series C
NTN - F	National Treasury Note - series F
PD	Probability of Default in Private Securities
PE	Expected Loss
PEA	Aggravated Expected Loss
PF	Pension Funds Entities
PIB	Gross Domestic Product
PNAD	National Research for Domicile Sample

Previc   Brazilian Pension Funds Authority
REP   Brazilian Pension Funds Stability Report
RF   Fixed Income Rate Bonds and Securities
SBR   Risk-Based Supervision
Selic   Brazilian benchmark interest rate
Sest State   Company Governance and Coordination Department
SPCF   Private Complementary Pension System
Susep   Private Insurance Superintendence
TA   Actuarial Index
TOI   Total Investments
TPA   Assessed Private Security
VC   Variable Contribution Plan