

# Legal framework of Mexican pensions: Empirical analysis through structured financial products in the period 2018-2019

## Marco jurídico de las pensiones mexicanas: análisis empírico mediante productos financieros “estructurados” en el periodo 2018-2019

Héctor Alonso Olivares-Aguayo, Ana Laura Medina-Conde  
y Oscar Javier Apáez-Pineda

*Facultad de Negocios de la Universidad La Salle-México, Universidad Autónoma de Tlaxcala, México, Facultad de Derecho de la Universidad La Salle-México*

### *Abstract*

The law establishes that in retirement management fund (AFORES) the money of the pension system savers is invested, seeking to obtain the highest possible returns, however, currently these returns can be negative, therefore, the general objective of the research propose as an alternative the total investment of the resources for each SIEFORE in structured financial products *Put Spread* and *Call Spread* considering the main invertible sector indices (Materials, Industrial, Financial Services and Consumer Products) as subyacent. The results show that by investing in this type of products the resources that are available in each type of SIEFORE, the profits obtained in the Materials Sector are better than those presented by CONSAR at the end of the first and second quarter of 2019, and for the other sectors, the returns was always positive.

*Keywords: AFORE, labor law, social security, pensions.*

### *Resumen*

La ley establece que en las Administradoras de Fondos para el Retiro (AFORES) el dinero de los ahorradores del sistema de pensiones es invertido, buscando obtener el mayor rendimiento posible, sin embargo, actualmente dichos rendimientos pueden ser negativos, por ello, el objetivo general de la investigación propone como alternativa una total inversión de los recursos para cada Sociedad de Inversión Especializada en Fondos para el Retiro (SIEFORE) en productos financieros “estructurados” *Put Spread* y *Call Spread* considerando como subyacentes los principales índices sectoriales invertibles (Materiales, Industrial, Servicios Financieros y Consumo Frecuente). Los resultados muestran que invertir en este tipo de productos los recursos que se tienen en cada tipo de SIEFORE, las ganancias obtenidas en el Sector Materiales son mejores a las presentadas por la Comisión Nacional del Sistema de Ahorro para el Retiro (CONSAR) al cierre del primer y segundo trimestre de 2019, y para los demás sectores, los rendimientos siempre se muestran positivos.

*Palabras clave: AFORE, derecho laboral, seguridad social, pensiones.*

## INTRODUCTION

The Chilean pension system was ground-breaking on its implementation of individual capitalisation formulas and its model was exported to many countries, including Mexico, whereas of half-way through the nineties, it was implemented for workers from the private sector.

Currently, according to (Lara y Silva, 2014; Pérez *et al.*, 2017; & Aguiló y Echeverría, 2020), the Chilean pension system has endured worldwide criticism, and once it started to grant a pension to its workers, the received pensions did not manage to exceed the minimum wage in Chilean society. Additionally, it is insufficient for pensioners faced with the current cost of living.

This research work begins with the hypothesis that increasing the rate of investment in Structured will improve the profits received by the resources allocated to SIEFORES, which would allow it to comply with the legal provision of investing the money of savers from the pensions system with a view to obtaining the biggest yield possible.

The particular objectives of the investigation are: Analyse the historical background of the system reform for the pensions of workers regulated by Section A of the Constitutional Article 123, which is to say workers from the private sector, distinct in that additionally the arguments and promises used to support it are analysed.

Specify the legal standards that are related to the *AFORES*<sup>1</sup> system, presenting an overall picture of the current positive regulations, their interrelationships, and the interpretations which the courts have issued related to them.

This propose, with a basis in a legal and financial assessment, the measures that ought to be implemented with the aim of the yields obtaining better results and specifying the necessary legal and financial actions to the effect of the investment proposal in “*Put Spread*” and “*Call Spread*” Structured financial products.

The structure of the document begins with a passage to specify the origin of *AFORES* in Mexico, the precedents behind the ‘*Sistema de Ahorro*

<sup>1</sup> Article 18 of the SAR Law defines AFORES as those that in a habitual and professional manner dedicate themselves to administering the individual accounts in their nature as financial entities, as well as managing Investment Companies (LSAR 2014). They are created as a Variable Capital Company and are authorised by CONSAR, for the management of savings they charge commission through SIEFORES which are an investment fund in which the AFORES function as an investment mechanism for the resources of the workers. There are four basic SIEFORES which depend directly on age, and the risk of old age reduces when this increase.

*para el Retiro*' (Retirement Savings System) (SAR), and continues with the specification of what the Structured Notes *Call Spread* and *Put Spread*; and the analysis of the results; finally, the final conclusions and reflections produced by the analysis are presented.

## THE ORIGIN OF AFORES

The '*Administradoras de Fondos para el Retiro*' (Retirement Funds Administrators) system (AFORES) was implemented in Mexico in the mid-nineties through a reform to the prevailing laws of the workers' pension system, according to the '*Constitución Política de los Estados Unidos Mexicanos*' (Political Constitution of the United States of Mexico) (CPEUM) in Article 123 section A and its regulation laws (*Ley Federal del Trabajo y la Ley del Seguro Social*- Federal Labour Law and the Social Security Law), establishing the security and protection from the risk of longevity in the '*Instituto Mexicano del Seguro Social*' (Mexican Institute of Social Security) (IMSS), an institution which in turn finds itself regulated by its corresponding law, and thus pensions are an integral aspect of people's Social Security.

One of the oldest precedents of Social Security is charity. The problem with this type of help is that it depended on the good will of people and legal protection did not exist. Setter (1982) and De Buen (1997) say that it is in Germany in 1883 where the first systems against sickness and old age arose thanks to Chancellor Otto Von Bismarck, who gave it a tripartite structure and gave rise to the first Social Security Code.

In Mexico, Ignacio Ramírez tried to incorporate the protection of orphans, women, and workers in the Constitution of 1857, but it wasn't until the Constitution of 1917 that these rights were established.

The concept of Social Security according to Ruiz (1999) arose in 1995 when the International Labour Organisation (ILO) carried out an attempt to define Social Security as a measure that society establishes for its members against the risks that they cannot cover with their own resources. Beveridge as cited in Olea (1983) agrees with Arce (1972) in that establishing measures to protect citizens in situations of need, such as old age, pertains to the state. Sainz (2008) coincides with Sánchez (1987) in that Social Security is a form of worker protection in its relationship with subordination. However, there is a social pact in which the citizen submits to the State through contributing a part of their income so that it is returned in the form of goods and services. Thus, Social Security is not an act of charity from the State, but in fact a right, a bilateral compensation.

ILO (2001) in the definition of Social Security incorporates elements such as ensuring medical assistance and income as: old age, maternity, disability, and labour accidents.

The constitutional basis of Social Security is found in section XXIX of Article 123, which establishes, as a social utility, the establishment of popular insurance funds for: disability, life, involuntary termination of work, and accidents. As such, the federal government, as with that of all states, should foster the organisation of institutions of this type (CPEUM, 2019).

The main Social Security institutions in the country are the '*Instituto Mexicano del Seguro Social*' (Mexican Institute of Social Security) (IMSS), the '*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*' (Institute of Security and Social Services for State Workers) (ISSSTE), and the '*Instituto del Fondo Nacional de la Vivienda para los Trabajadores*' (Institute of the National Fund of Housing for Workers) (INFONAVIT), within which there are specific risk protection systems. At IMSS, which is a decentralised public organisation with legal status, its own tripartite capital, and where the compulsory system is found, the contingency of '*Retiro de Cesantía en Edad Avanzada y Vejez*' (Redundancy Retirement in Advanced and Old Age) where the conditions to have the right to a future pension are: ranging from an age of 60 to 65 years and have been listed before the IMSS for a minimum of 1250 weeks (approximately 24 years).

'*La Ley del Seguro Social*' (Law of Social Security) (LSS) was reformed in December 1995. Before this law, only 500 contributions were necessary, but (Solís, 2001; Ruiz-Medina, Quintero, & Cuadras, 2016; García, 2015) affirm that it operated through a delivery system that was administered by the IMSS. Pensions were paid with the contributions from workers, employers, and government, plus the yields from the accumulated retirement funds. The reform was based on multiple causes, including demographic changes (increase in life expectancy), financial invalidity, and unfavourable economic events. The former foretold positive events in increasing saving through various means.

On July 1st 1997, the administration moved the individual administered accounts to become AFORES. However, according to ILO (2018), between 1981 and 2014, thirty countries totally or partially privatised their public system for compulsory pensions. Mexico was among them, propelled by the World Bank (WB), the International Monetary Fund (IMF), and the Organisation for Economic Co-operation and Development (OECD) among other organisations. By 2018, eighteen countries reverted these

reforms when they analysed the inconveniences of administration in the private sector.

Cruz (1997) affirms that with the reform, the sum of the pensions was up to the market, which has importance for the Social Security institutions, since the management of substantial financial resources is transferred to private financial entities.

### **PRECEDENTS TO THE RETIREMENT SAVINGS SYSTEM (SAR)**

One of the main arguments to reform the pensions system was the actuarial imbalance that the delivery system began to notice (Nava & Ham, 2006), but prior to its modification the '*Sistema de Ahorro para el Retiro*' (Retirement Savings System) (SAR-92) was created.

In 1992, President Carlos Salinas de Gortari rolled out SAR. This system functioned with the payments that the employers carried out for the retirement of workers and those of the housing fund. These resources were deposited in banks where along with a commission payment, were sent to the Bank of Mexico, and then they were invested in government debt bonds.

Additionally, the '*Comision Nacional del Sistema de Ahorro para el Retiro*' (National Commission for the Retirement Savings System) (CONSAR) was created in 1994 as an independent organisation of the '*Secretaria de Hacienda y Credito Publico*' (Ministry of the Treasury and Public Credit) (SHCP) focused on regulation faculties (control and security of SAR-92). In accordance with the law, CONSAR was thus trusted with guarding SAR operations.

By 1995, reform for the LSS was carried out. Similarly, its objective was to change the pensions system that was based on the distribution system with defined benefit, under the principle of generational solidarity. The proposal was a system of individual accounts, due to which the reform brought with it the creation of the new individual capitalisation pension system.

In order to complete the reform, and so that the system could function in 1996, the '*Diario Oficial de la Federación la Ley del SAR*' (Official Journal of the Federation of the SAR Law) was published; for reforms to diverse related legislation, the CONSAR was given a leading role as the regulatory organisation, and it legislated in relation to the implementation of the AFORES system and the denominated SIEFORES, which are those that directly invest the resources of the workers, primarily in the stock market.

The system began functioning from June 1st 1997, and as such had already modified various laws. Thus, the definition of work by the SIEFORES as financial entities operated and administered by AFORES and authorised by CONSAR began.

This had as its objective the independent investment of savings from individual accounts to AFORES through diverse basic SIEFORES according to the age range of the workers. Thus, the law established that the resources of the individual accounts were to be invested in SIEFORE corresponding to each worker according to their age.

Regarding the aforementioned age range of the workers, the four following types of SIEFORES were produced: SB1 (60 years and older), SB2 (46 to 59 years), SB3 (37 to 45 years) and SB4 (36 years and younger).

Before the reform of 2009 to the SAR Law, commissions came to 1.86 per cent. Now the average is of 0.98 per cent, given that the governing body acquired faculties to authorise such commissions.

The jurisprudential thesis 2a./J. 26/2011 asserts, regarding commissions, that *“SAR. article 37 of the relevant law, which anticipated the procedure to which the AFORES must adjust themselves in order to determine the commissions they can charge, does not violate article 39 of the federal constitution (effective legislation as of January 22nd 2009).”*

Article 37 of the SAR Law, due to establishing the procedure to which the AFORES had to adjust in order to determine the commissions that they can charge workers for their services (for the economic management of the funds from individual savings accounts for retirement entrusted to them), does not violate the principle of public power stemming from the sovereign people contained in article 39 of the Federal Constitution. This because of the fact that the commission was charged with the totality of the managed assets didn't go so far as to cause the public authorities to cease to act for the benefit of the people, inasmuch as the mere existence of the regulation in the matter (legislative level), its application to the addressees by the respective authorities (executive level) and its analysis through the appropriate means of defence (judicial level), shows that the public authorities are dedicated in their respective spheres of competence to dealing with the subject matter inherent to the SAR in benefitting the population and, in a particular way, its labour sector, in the relative gradient of Social Security.

CONSAR (2019a) affirms that the commission of 1 per cent on the balance of the accumulated savings account can reduce the pension in a period of 40 years by 20 per cent, according to an analysis by the OECD.

On May 31st 2019, diverse modifications to the SIEFORES Investment System were published, in which the multifunds scheme was changed to one of generational funds called '*Fondos de Inversión Especializada en Fondos para el Retiro*' (Investment Funds Specialised in Funds for Retirement) (Fiefores), as a long-term investment strategy. These funds allowed investments to be carried out in derivative financial products.

Some recent investigations regarding pension plans on a global level are shown by Amaro and Alfonso (2018), who analyse the impacts of population aging on the distribution pension plans in three countries: Brazil, Spain, and France. For their part, Koh *et al.* (2021) are based on the life panel in Singapore, evaluating how confidence is linked with participation and the retirements of pension plans of older adults. Kim *et al.* (2021) study the case of the United States, examining the exclusion of the cost of pensions from salary expenses in the public sector using a 15-year panel of data with state pension plans for teachers.

In Mexico's case, some interesting investigations can be found in Farfan (2017) who analyses how the Constitution of 1917, article 123, section XXIX, as well as relevant legislation, define the basis of the Mexican social security model. Murillo and Venegas (2011) obtain estimations of provisional coverage indicators or retirement for the Mexican population older than 65, and evaluate the impact of the pension system on transactions around the retirement in average and advanced ages, using micro-economic data from the '*Encuesta Nacional de Salud y Envejecimiento de Mexico*' (National Survey of Health and Aging of Mexico). Rodriguez (2017) analyses the risk of longevity, defined as the possibility that people exceed their life expectancy, which implies a potential underestimation of the reserves that are maintained to comply with passive futures, proposes a swap of longevity as an alternative to managing risk, using the natural coverage that opposing positions charge regarding the same risk, in order to apply the management of the risk of longevity which the Federal Government of Mexico faces.

Finally, Lopez *et al.* (2020) analyses the rapid growth that the Mexican population has had in its sustained aging in 1997, its traditional distribution system for a private management program, in which the contributions for or in the name of active workers are deposited in individual accounts and are directed to a privately managed pensions fund. They also carry out an exhaustive analysis for the '*Sociedades de Inversión Especializadas de Fondos para el Retiro*' (Specialised Investment Societies for Retirement Funds), considering different levels of risk.

Regarding investments, Kyriakow *et al.* (2021) show advances in the development of pension products, which appear to favour alternatives to the risk-free asset; they apply a completely non-parametric softening with covariables and the softening parameter chosen by cross-validation in order to forecast the yield of actions in excess of different reference points, including short-term interest; they observe that the model predicts better future annual yields for actions. This is a crucial conclusion for actuarial applications which aim to supply predictions for real deposits for pensioners.

Dopierata and Mosionek (2021) evaluate the impact of the introduced reforms in the functioning of Polish open pension funds on the style of management, the exposure to risk and the yield of the related investments. They examine if the elimination of the internal reference index for the evaluation of funds impacts the elimination or reduction of gregarious sharing; the results indicate that highly regulated funds can slightly exceed the reference indexes. Additionally, they express that the limitation of investments in Treasury debt instruments clearly resulted in higher risk and volatility of yields. López and Walker (2021) study the performance of investments in Chilean pensions during the period (2003-2017); they consider regulatory restrictions and restrictions regarding currency hedging. The results have policy implications for the regulation of investments in pension systems with similar characteristics to that of Chile.

Wang *et al.* (2021) investigate a solid problem of the optimal portfolio choice for an individual with a defined contribution (DC) pension plan. The individual has a stochastic salary, considers the risk of inflation and invests the assets of their pension account in a financial market which consists of a risk-free asset, a bond which is indexed to inflation, and an action whose expected rate of yield follows a process of reversion to the mean. They find that the ambiguity around the price dynamic of the bonds indexed to inflation, the price of the actions, and the expected rate of yield will lead to the loss of the utility. McCarthy *et al.* (2021) show the role that institutional shareholders have in the decision of a business to discharge the liabilities of pensions to professional risk administrators. They find that the probability of pension risk transferences is bigger for the businesses with a higher level of institutional property and independent institutional properties.

The difference between this document and the investigations shown in the previous paragraphs consists of the fact that this work proposes, as an alternative to the investment of resources for each *SIEFORE*, the Structu-

red financial products<sup>2</sup>, also known as Structured Notes (SN) “*Put Spread*” and “*Call Spread*”, considering the closing prices of the main invertible sectoral indices (Materials, Industrial, Financial Services and Frequent Consumption), as shown in Table 1. In the following section the methodology is set forth.

Table 1: Main invertible sectoral

Index	Representing Sector
S&P/BMV Material Selective Sector	Materials
S&P/BMV Industrial Selective Sector	Industrial
S&P/BMV Frequent Consumption Selective Sector	Frequent Consumption
S&P/BMV Financial Selective Sector	Financial Services

Source: Self-made based on the BMV web page, 2019.

#### **METHODOLOGY. *CALL SPREAD AND PUT SPREAD* STRUCTURED NOTES**

Based on the ‘*Manual de Metodologías*’ (Methodologies Manual) by Valmer<sup>3</sup> (2009), the continuation of the methodology for a *Call Spread* SN is shown:

The valuation price of the *Call Spread* SN is given by the following expression:

$$P_{vc} = P_B + P_D * F \quad (1)$$

Where:

$F$ : Established factor in the determined prospect by the dispatcher since the inception of the deposit, adjusts the SN yield.

$P_{vc}$ : Valuation price of the *Call Spread* SN.

$P_B$ : Price of the zero-coupon bond.

$P_D$ : Implied options bonus in the strategy, given by:

$$P_D = C_{K1} - C_{K2} \quad (2)$$

Where  $C_{K1}$  and  $C_{K2}$  are the options of a *Call*, with exercise prices  $K_1$  and  $K_2$  respectively.

<sup>2</sup> Structured financial products are a product of financial engineering, which seeks the innovation of new products for investors. A hybrid between a derived product and a financial instrument of fixed equity. The financial options are the most used derived product for the formation of Structural financial products. The most common Structured products are guaranteed capital, which guarantee upon expiry that at least the initial investment will not be lost.

<sup>3</sup> Operative Valuation and S.A. to C.V. Market References.

$$P_B = \frac{VN}{\left(1 + TLR \frac{n}{360}\right)} \quad (3)$$

Where:

VN: Nominal value of the *Call Spread* SN.

n: Number of days for the SN to mature.

TLR: Risk-free Interest rate (CETES) associated with the number of days to mature.

The option value for both options is obtained through the general formula by Black and Scholes (1973) and Merton (1973), since both options are only exercised upon the maturation of the SN.

$$C_K = S_0 N(d_1) - K e^{-TLR * T} N(d_2) \quad (4)$$

Where:

$d_1$ ,  $d_2$  y  $T$  is defined as:

$$d_1 = \frac{\ln\left(\frac{S_0}{K}\right) + \left(TLR + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}, \quad d_2 = d_1 - \sigma\sqrt{T} \quad y \quad T = \frac{n}{365}$$

Where:

$C_K$ : *Call* option type bonus with exercise price  $K$ .

$S_0$ : Initial value of the subjacent.

$N(\bullet)$ : Accumulated probability of the normal standard distribution in the  $(\bullet)$  value.

$\sigma$ : Yield volatility of the subjacent.

On the other hand, the price of the *Put Spread* SN valuation is given by the following expression:

$$P_{vp} = P_B + P_D * F \quad (5)$$

Where:

$F$ : Established factor in the determined prospect by the dispatcher since the inception of the deposit, adjusts the SN yield.

$P_{vp}$ : Valuation price of the *Put Spread* SN.

$P_B$ : Price of the zero-coupon bond.

$P_D$ : Implied options bonus in the strategy, given by:

$$P_D = C_{K_2} - C_{K_1} \quad (6)$$

Where  $C_{K_1}$  and  $C_{K_2}$  are the options of a *Put*, with exercise prices  $K_1$  and  $K_2$  respectively.

The valuation of the zero-coupon bond and the incorporated *puts* in the SN are determined in the following way:

$$P_B = \frac{VN}{\left(1 + TLR \frac{n}{360}\right)} \quad (7)$$

Where:

VN: Nominal value of the *Put Spread* SN.

n: Number of days for the SN to mature.

TLR: Risk-free Interest rate (CETES) associated with the number of days to mature.

$$P_K = Ke^{-TLR*T}N(-d_2) - S_0N(-d_1) \quad (8)$$

Where:

$d_1$ ,  $d_2$  y  $T$  are defined as:

Where:

$$d_1 = \frac{\ln\left(\frac{S_0}{K}\right) + \left(TLR + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}, \quad d_2 = d_1 - \sigma\sqrt{T}, \quad T = \frac{n}{365}, \quad N(-d_2) = 1 - N(d_2) \text{ y } N(-d_1) = 1 - N(d_1)$$

$P_k$ : *Put* option type bonus with exercise price  $K$ .

$S_0$ : Initial value of the subjacent.

$N(\bullet)$ : Accumulated probability of the normal standard distribution in the  $(\bullet)$  value.

$\sigma$ : Yield volatility of the subjacent.

## RESULTS ANALYSIS

The information from the last trimester of 2018 and the first two trimesters of 2019 were extracted from the CONSAR page. This is in order to carry

out a comparison from the closing of March and June of 2019 between the real information reflected by said institution where results are shown for each type of SIEFORE upon diversifying the workers' resources against the alternative of investing the entirety of the resources in the Structured financial product.

The information reported by CONSAR in its last trimester of 2018 is shown in Table 2:

The obtained results for the Materials Sector for the following trimester for each type of SIEFORE is shown in Table 3:

Table 3 shows that in each type of SIEFORES, profit was made with the *SN Put Spread*; making 3,791,132,074,078 Mexican pesos; such amount represents a total profit for the trimester of 14.43 per cent.

The results obtained for the Industrial Sector at the close of the first trimester of 2019 for each type of SIEFORE are shown in Table 4:

Table 4 shows that for each type of SIEFORES, a profit was obtained with the *Call Spread SN*; obtaining 3,404,127,795,731 Mexican pesos this way; such amount represents a total profit for the trimester of 2.75 per cent.

The results for the Financial Sector at the closing of the first trimestre of 2019 for each type of SIEFORE, are shown in Table 5:

Table 5 shows that in all types of SIEFORES profits were obtained with the *Call Spread SN*; obtaining almost 3,510,953,926,106 Mexican pesos as value for the total at the end of March; such amount represents a total trimestre profit of 5.97 per cent.

The results obtained for the Frequent Consumption Sector at the closing of the first trimester of 2019 for each type of SIEFORE, are shown in Table 6:

Table 6 shows that in all types of SIEFORES profit was made with *Put Spread SN*; obtaining 3,462,106,545,935 Mexican pesos as total value by the end of March; such amount represents a total trimestre profit of 4.5 per cent.

By comparing the results obtained against the ones shown by CONSAR, results are shown in Table 7.

Table 7 shows a total value of 3,537,067,450,000 Mexican pesos at the end of March; such amount represents a total trimestral profit of 6.76 per cent. Despite this, it should be mentioned that not in all types of SIEFORES profits from the investments were obtained. At SB0 and SB1, where we can find the resources for sixty-year-old people or more, real losses of 0.14 per cent y 0.28 per cent can be seen at the end of March of the current year.

Table 2: Net worth for AFORE y SIEFORE (millions of pesos at the closing of December 2018)\*

AFORE	SB0	SB1	SB2	SB3	SB4	SA	TOTAL
XXI-BANORTE	18,825.65	28,570.92	302,952.03	201,687.48	122,287.41	70,105.41	744,428.90
CITIBANAMEX	10,313.35	14,007.97	190,675.53	181,759.66	196,494.55	499.13	593,750.18
SURA	10,530.16	12,794.12	195,323.75	157,954.33	110,929.24	2,323.93	489,855.54
PROFUTURO	12,613.42	18,162.63	205,919.36	169,093.13	73,972.97	7,372.84	487,134.35
INVERCAP	2,684.34	3,545.48	66,325.24	60,701.96	35,604.32	0.00	168,861.34
PENSIONISS- TE	23,254.04	22,804.02	66,710.25	39,813.55	53,746.43	0.00	206,328.28
PRINCIPAL	5,860.67	10,311.77	101,914.16	71,082.36	35,024.25	0.00	224,193.21
COPPEL	2,576.29	1,814.07	43,319.76	50,060.58	106,725.59	0.00	204,496.28
INBURSA	1,795.73	6,108.97	64,029.85	33,580.81	13,901.94	0.00	119,417.29
AZTECA	1,489.12	1,425.46	22,301.01	23,066.90	26,102.55	0.00	74,385.04
SUMA	89,942.78	119,545.40	1,259,470.93	988,800.75	774,789.25	80,301.31	3,312,850.42

\*Amounts calculated with the prices of the SIEFORES actions registered in 'Bolsa Mexicana de Valores (Mexican Stock Market)' the last working day of the month and which corresponds to the accounting data of the penultimate working day of the month.

Source: Self-made with information from CONSAR (2018).

Table 3. Results obtained with the *Put Spread* SN for the Materials Sector at the end of March 2019

Concept	Materials SB0	Materials SB1	Materials SB2	Materials SB3	Materials SB4	Additional Material SIEFORES
Time (T)	3 months	3 months	3 months	3 months	3 months	3 months
CETES % (TLR)	2.00	2.00	2.00	2.00	2.00	2.00
Nominal Value (VN)	89,942,780,000	119,545,400,000	1,259,470,930,000	988,800,750,000	774,789,250,000	80,301,310,000
Bond Price (P <sub>B</sub> )	89,179,196,078	117,201,372,549	1,234,775,421,569	969,412,500,000	759,597,303,922	78,726,774,510
Investment in the derivative (CETE bond profit) (VN-P <sub>B</sub> )	1,763,583,922	2,344,027,451	24,695,508,431	19,388,250,000	15,191,946,078	1,574,535,490
Real profit from the derivative (G)	12,985,186,814	17,258,965,664	181,831,885,927	142,754,787,662	111,857,596,049	11,593,231,961
Real profit from the <i>Put Spread</i> Structured Note G+(VN-P <sub>B</sub> )	14,748,770,736	19,602,993,115	206,527,394,359	162,143,037,662	127,049,542,128	13,167,767,451
Final Result of the Asset (VN+G)	102,927,966,814	136,804,365,664	1,441,302,815,927	1,131,555,537,662	886,646,846,049	91,894,541,961

Source: Self-made with Excel 2016.

Table 4: Results obtained with the *Call Spread* SN for the Industrial Sector at the close of March 2019

Concept	Industrial SB0	Industrial SB1	Industrial SB2	Industrial SB3	Industrial SB4	Additional Industrial SIEFORES
Time (T)	3 months	3 months	3 months	3 months	3 months	3 months
CETES % (TLR)	2.00	2.00	2.00	2.00	2.00	2.00
Nominal Value (VN)	89,942,780,000	119,545,400,000	1,259,470,930,000	988,800,750,000	774,789,250,000	80,301,310,000
Bond Price ( $P_b$ )	88,179,196,078	117,201,372,549	1,234,775,421,569	969,412,500,000	759,597,303,922	78,726,774,510
Investment in the derivative (CETE bond profit) (VN- $P_b$ )	1,763,583,922	2,344,027,451	24,695,508,431	19,388,250,000	15,191,946,078	1,574,535,490
Real profit from the derivative (G)	2,478,150,198	3,293,776,962	34,701,597,333	27,243,951,926	21,347,395,904	2,212,503,408
Real profit the Structured Note Call Spread $G+(VN-P_b)$	4,241,734,120	5,637,804,413	59,397,105,765	46,632,201,926	36,539,341,982	3,787,038,898
Final Result of the Asset (VN+G)	92,420,930,198	122,839,176,962	1,294,172,527,333	1,016,044,701,926	796,136,654,904	82,513,813,408

Source: Self-made through Excel 2016.

Table 5. Results with *Call Spread* SN for the Financial Sector at the closing of 2019

Concept	Financial SB0	Financial SB1	Financial SB2	Financial SB3	Financial SB4	Additional Financial SIE-FORES
Time (T)	3 months	3 months	3 months	3 months	3 months	3 months
CETES % (TLR)	2.00	2.00	2.00	2.00	2.00	2.00
Nominal Value (VN)	89,942,780,000	119,545,400,000	1,259,470,930,000	988,800,750,000	774,789,250,000	80,301,310,000
Bond Price (P <sub>B</sub> )	88,179,196,078	117,201,372,549	1,234,775,421,569	969,412,500,000	759,597,303,922	78,726,774,510
Derivate investment (CETE bond profit) (VN-P <sub>B</sub> )	1,763,583,922	2,344,027,451	24,695,508,431	19,388,250,000	15,191,946,078	1,574,535,490
Real profit from the derivate (G)	5,378,443,880	2,344,027,451	75,314,480,112	59,128,807,698	46,331,239,706	4,801,898,377
Real profit from the Call Spread Structured Note G+(VN-P <sub>B</sub> )	7,142,027,802	9,492,663,784	100,009,988,544	78,517,057,698	61,523,185,784	6,376,433,867
Final Result of the Asset (VN+G)	95,321,223,880	126,694,036,333	1,334,785,410,112	1,047,929,557,698	821,120,489,706	85,103,208,377

Source: Self-made with Excel 2016.

Table 6: Results obtained with the *Put Spread* SN for the Frequent Consumption Sector at the closing of March 2019

Concept	Frequent consumption SB0	Frequent consumption SB1	Frequent consumption SB2	Frequent consumption SB3	Frequent consumption SB4	Additional Frequent Consumption SIEFORES
Time (T)	3 months					
CETES % (TLR)	2.00	2.00	2.00	2.00	2.00	2.00
Nominal value (VN)	89,942,780,000	119,545,400,000	1,259,470,930,000	988,800,750,000	774,789,250,000	80,301,310,000
Bond price (P <sub>B</sub> )	88,179,196,078	117,201,372,549	1,234,775,421,569	969,412,500,000	759,597,303,922	78,726,774,510
Derivate investment (CETE bond profit) (VN-P <sub>B</sub> )	1,763,583,922	2,344,027,451	24,695,508,431	19,388,250,000	15,191,946,078	1,574,535,490
Real profit from the derivate (G)	4,052,253,859	5,385,961,035	56,743,809,079	44,549,119,506	34,907,112,368	3,617,870,087
Real profit from the Put Spread Structured Note G+(VN-P <sub>B</sub> )	5,815,837,781	7,729,988,486	81,439,317,5103	63,937,369,506	50,099,058,447	5,192,405,577
Final Result of the Asset (VN+G)	93,995,033,859	124,931,361,035	1,316,214,739,079	1,033,349,869,506	809,696,362,368	83,919,180,087

Source: Self-made through Excel 2016.

Table 7: Net Assets for AFORE and SIEFORE (millions of pesos at closing on March 2019)\*

AFORE	SB0	SBI	SB2	SB3	SB4	SA	TOTAL
XXI-BANORTE	18,550.69	28,085.73	320,999.78	216,258.74	133,868.49	76,477.42	794,240.85
CITIBANAMEX	10,353.18	13,654.32	200,933.04	194,108.52	220,403.36	524.85	639,977.27
SURA	10,418.82	12,253.17	206,293.06	169,073.61	123,921.45	2,395.17	524,355.28
PROFUTURO	12,708.90	18,017.05	218,378.62	180,804.43	82,725.08	8,155.51	520,789.59
INVERCAP	2,662.74	3,397.78	68,189.52	62,736.90	37,420.25	0.00	174,407.19
PENSIONISSSTE	23,342.68	24,184.41	75,736.57	42,798.94	58,319.96	0.00	224,382.56
PRINCIPAL	5,835.63	10,125.81	106,561.33	74,902.93	37,570.47	0.00	234,996.17
COPPEL	2,572.10	1,826.27	46,013.79	52,895.60	113,594.18	0.00	216,901.94
INBURSA	1,825.28	6,085.95	65,677.90	34,658.82	14,549.79	0.00	122,797.74
AZTECA	1,543.85	1,570.54	25,371.15	25,958.59	29,774.73	0.00	84,218.86
SUMA	89,813.87	119,201.03	1,334,154.76	1,054,197.08	852,147.76	87,552.95	3,537,067.45

\* Amounts calculated according to bonds pricing for SIEFORE, as registered at the Mexican Stock Market on the last day of the month, and which correspond to the accountable information of the penultimate day of the month.  
Source: Self-made with information from CONSAR (2019b).

Table 8 shows the investment percentage in financial instruments, including the structured ones.

Table 8: Structure of investment portfolios of SIEFORES  
(percentage according to the value of the managed portfolios)

Type of instrument	SB0 %	SB1 %	SB2 %	SB3 %	SB4 %	SA %	TOTAL %
Government Debt Pesos	100.00	65.90	51.30	47.90	43.40	69.40	50.60
Foreign Currency Government Debt	0.00	0.70	0.70	0.90	0.70	0.10	0.70
Airlines	0.00	0.10	0.00	0.00	0.10	0.00	0.00
Food	0.00	0.50	0.80	0.90	0.70	0.00	0.80
Vehicles	0.00	0.10	0.20	0.20	0.30	0.10	0.20
Development Banking	0.00	1.80	1.50	1.30	1.00	1.10	1.30
Banking	0.00	1.20	1.20	1.20	1.00	0.80	1.10
Drinks	0.00	0.70	0.60	0.60	0.60	0.20	0.60
Cement	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malls	0.00	0.10	0.10	0.10	0.10	0.00	0.10
Consumption	0.00	0.30	0.30	0.30	0.40	0.10	0.30
State productive companies	0.00	4.10	2.90	2.60	2.40	2.10	2.60
States	0.00	0.80	0.40	0.40	0.30	0.60	0.40
Euro pesos	0.00	2.90	3.10	3.00	2.80	0.70	2.90
Industrial Groups	0.00	0.80	0.60	0.60	0.50	0.00	0.60
Infrastructure	0.00	5.00	3.90	3.80	4.30	1.40	3.80
Real State	0.00	0.00	0.00	0.10	0.10	0.00	0.10
Others	0.00	1.10	1.00	0.90	0.90	0.30	0.90
Paper	0.00	0.10	0.10	0.10	0.10	0.00	0.10
Financial Services	0.00	0.40	0.40	0.50	0.50	0.10	0.40
Steel Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Telecom	0.00	1.10	1.30	1.10	0.90	0.20	1.10
Transportation	0.00	0.40	0.50	0.60	0.60	0.00	0.50
Housing	0.00	2.30	1.50	1.40	1.30	1.10	1.40
Structured products	0.00	0.90	6.00	7.30	6.60	0.10	6.10
Fibers	0.00	1.50	2.80	2.70	2.80	2.10	2.60
Misc. Rents	0.00	2.00	5.40	6.30	8.90	4.70	6.20
International Debt	0.00	1.20	1.00	1.00	1.10	0.00	1.00
International Varied Rent	0.00	3.90	11.90	14.00	17.20	14.30	13.20
Goods	0.00	0.00	0.30	0.40	0.40	0.60	0.30
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Amounts for the closing of December 2018.

Source: CONSAR (2018).

Table 8 shows the investment percentages performed in Structured products for the different types of SIEFORES. Investment rate ranges from 0.00 per cent for the SB0 to 7.30 for SB3. These percentages are small in general. Nevertheless, from this Table we should outline two things: The first observation is that at the three SIEFORES with a higher investment percentage (SB2, SB3 and SB4), are those SIEFORES with a higher real profit according to the information given by CONSAR at the closing of the month of March. Such percentual profit lies within a range of 5.92 per cent to 9.98 per cent in all cases corresponding to the previous month. In monetary terms, for SB2 is equivalent to 74,683,830,000 Mexican pesos; for SB3 of 65,396,330,000 Mexican pesos, and for SB4 77,358,751,000 Mexican pesos. In all three cases, the profit is of about a billion Mexican pesos. For the SB0 and SB1, we can see a loss of only 0.00 per cent and 0.90 per cent of investment in Structured products.

In Table 9, a comparative summary is given for the money differences regarding the results obtained and the real values shown by CONSAR for each SIEFORE at the closing of the last trimester of 2018 and the first of 2019.

Table 9 demonstrates that for the types of SIEFORES, investment in the Materials Sector showed better results. Their profit compared to the previous trimestre were higher, with a total sum of 478,281.65 million of Mexican pesos, representing more than the double shown by CONSAR through assets diversification. In the same way, the data in other sectors presented the information where SB0 and SB1 always obtained the best profit to those shown by CONSAR. CONSAR revealed losses for those SIEFORES of 128.91 and 344.37 million pesos respectively.

With the intention of broadening the analysis for this research, information for the first two trimesters of 2019 and using the information from CONSAR corresponding to Table 7 were used.

The results obtained for the Materials Sector for the next trimestre for each type of SIEFORE as shown in Table 10 are analysed.

Table 10 shows that in all types of SIEFORES profit was obtained with the *Put Spread* SN; thus obtaining 3,847,398,072,787 Mexican pesos as total value by the end of the month of June. Such amount represents a total profit in the trimestre of 8.77 per cent.

The results from the Industrial Sector at the following trimestre for each type of SIEFORE are shown in Table 11:

Table 9: Monetary differences in the last trimestre of 2018 and the first trimestre of 2019 in SIEFORES (amounts given in millions of pesos)

Concept	SB0	SB1	SB2	SB3	SB4	SA	TOTAL
Real differences	-128.91	-344.37	74,683.83	65,396.33	77,358.51	7,251.64	224,217.03
Material differences	12,985.20	17,258.97	181,831.89	142,754.79	111,857.60	11,593.23	478,281.65
Industrial differences	2,478.15	3,293.78	34,701.60	27,243.95	21,347.40	2,212.50	91,277.38
Financial differences	5,378.44	7,148.64	75,314.48	59,128.81	46,331.24	4,891.90	198,103.51
Frequent Consumption Differences	4,052.25	5,385.96	56,743.81	44,549.12	34,907.11	3617.87	149,256.13

Sources: Self-made through Excel 2016.

Table 10. Results obtained with the *Put Spread* SN for the Materials Sector at the closing of June 2019

Concept	Materials SB0	Materials SB1	Materials SB2	Materials SB3	Materials SB4	Additional SIEFORES Materials
	3 months	3 months	3 months	3 months	3 months	3 months
Time (T)						
CETES % (TLR)	2.06	2.06	2.06	2.06	2.06	2.06
Nominal Value (VN)	89,813,860,000	119,201,020,000	1,334,154,760,000	1,054,197,090,000	852,147,740,000	87,552,940,000
Bond price ( $P_B$ )	87,998,883,037	116,792,181,261	1,307,193,886,099	1,032,893,658,298	834,927,363,135	85,783,652,174
Derivate investment (CETE bond profit) ( $VN-P_B$ )	1,814,976,963	2,408,838,739	26,960,873,901	21,303,431,702	17,220,376,865	1,769,287,826
Real profit from the derivate (G)	7,879,972,720	10,458,305,498	117,054,351,229	92,491,785,914	74,764,640,391	7,681,607,035
Real profit from the structured note <i>Put Spread</i> $G+(VN-P_B)$	9,694,949,683	12,867,144,237	144,015,225,130	113,795,217,616	91,985,017,256	9,450,894,861
Asset final result ( $VN+G$ )	97,693,832,720	129,659,325,498	1,451,209,111,229	1,146,688,875,914	926,912,380,391	95,234,547,035

Source: Self-made through Excel 2016.

Table 11. Results obtained with the *Call Spread* SN for the Industrial Sector at the closing of June 2019

Concept	Industrial SB0	Industrial SB1	Industrial SB2	Industrial SB3	Industrial SB4	Additional Industrial SIEFO-RES
Time (T)	3 months	3 months	3 months	3 months	3 months	3 months
CETES % (TLR)	2.06	2.06	2.06	2.06	2.06	2.06
Nominal Value (VN)	89,813,860,000	119,201,020,000	1,334,154,760,000	1,054,197,090,000	852,147,740,000	87,552,940,000
Bond Price (P <sub>B</sub> )	87,998,883,037	116,792,181,261	1,307,193,886,099	1,032,893,658,298	834,927,363,135	85,783,652,174
Derivate investment (CETE bond profit) (VN-P <sub>B</sub> )	1,814,976,963	2,408,838,739	26,960,873,901	21,303,431,702	17,220,376,865	1,769,287,826
Real profit from the derivate (G)	762,350,039	1,011,791,523	11,324,454,074	8,948,142,216	7,233,124,848	743,159,098
Real profit from the structured note Call Spread G+(VN-P <sub>B</sub> )	2,577,327,001	3,420,630,262	38,285,327,975	30,251,573,918	24,453,501,713	2,512,446,924
Asset Final Result (VN+G)	90,576,210,039	120,212,811,523	1,345,479,214,074	1,063,145,232,216	859,380,864,848	88,296,099,098

Source: Self-made through Excel 2016.

Table 11 shows that in all types of SIEFORES a profit was obtained with the *Call Spread* SN; thus obtaining 3,567,090,431,798 Mexican pesos as a total value for the end of June: such amount represents a total profit of 0.84 per cent.

The results obtained for the Financial Sector at the following trimestre for each type of SIEFORE are shown in Table 12:

Table 12 shows that in all types of SIEFORES profit were obtained through *Call Spread* SN; thus obtaining 3,602,419,611,985 Mexican pesos as total value at the end of June, the amount represents a total profit of 1.84 per cent in the trimester.

The results obtained for the Frequent Consumption Sector on the following trimestre for each type of SIEFORE are shown in Table 13:

Table 13 shows that in all types of SIEFORES profits were obtained with the *Put Spread* SN; thus obtaining 3,571,474,498,598 Mexican pesos as total value at the end of the month of June. Such amount represents a total profit in the trimester 0.97 per cent.

The compared obtained results with the information from CONSAR are shown in Table 14.

Table 14 shows a total value for 3,692,740,700,000 Mexican pesos at the end of June, representing a total profit of 4.40 per cent. Nevertheless, we should emphasise that profit was not made in all types of SIEFORES according to the performed investment decisions. At the SB1 where we can find the resources for sixty-year-old people or more, a loss of 0.72 per cent was obtained at the end of the current year.

In Table 15 diversification of CONSAR financial tools is shown for the closing of March 2019.

Table 15 shows the investment percentages performed in Structured Products for the different types of SIEFORES. The range of investment ranges from 0.00 per cent for the SB0 until 7.3 per cent at the SB3. Results are consistent with those shown in the previous trimestre. The profit for SIEFORES SB2, SB3, and SB4 ranges from 3.56 per cent to 6.38 per cent in all cases corresponding to the previous closing trimestre. In monetary terms, SB2 is equivalent to 47,524,810,000 Mexican pesos, for SB3 of 49,223,800,000 Mexican pesos and for SB4 54,376,770,000 Mexican pesos. In all three cases the profit is of about fifty thousand million Mexican pesos. On the other hand, we can observe that at SB1 where only 0.9 per cent was invested in Structured Products, it was the only SIEFORE demonstrating real losses in the analysis performed for that trimestre.

Table 12: Results obtained with the *Call Spread* SN for the Financial Sector at the closing of June 2019

Concept	Financial SB0	Financial SB1	Financial SB2	Financial SB3	Financial SB4	Additional Financial SIEFORES
Time (T)	3 months	3 months	3 months	3 months	3 months	3 months
CETES % (TLR)	2.06	2.06	2.06	2.06	2.06	2.06
Nominal Value (VN)	89,813,860,000	119,201,020,000	1,334,154,760,000	1,054,197,090,000	852,147,740,000	87,552,940,000
Bond Price ( $P_B$ )	87,998,883,037	116,792,181,261	1,307,193,886,099	1,032,893,658,298	834,927,363,135	85,783,652,174
Derivate investment (CETE bond profit) ( $VN-P_B$ )	1,814,976,963	2,408,838,739	26,960,873,901	21,303,431,702	17,220,376,865	1,769,287,826
Real profit from the derivate (G)	1,659,435,018	2,202,403,356	24,650,350,488	19,477,746,159	15,744,605,565	1,617,661,400
Real profit from the structured note Call Spread $G+(VN-P_B)$	3,474,411,980	4,611,242,095	51,611,224,388	40,781,177,861	32,964,982,429	3,386,949,226
Asset Final Result (VN+G)	91,473,295,018	121,403,423,356	1,358,805,110,488	1,073,674,836,159	867,892,345,565	89,170,601,400

Source: Self-made through Excel 2016.

Table 13: Obtained results with the *Put Spread* SN for the Frequent Consumption Sector at the end of June 2019

Concept	Frequent Consumption SB0	Frequent Consumption SB1	Frequent Consumption SB2	Frequent Consumption SB3	Frequent Consumption SB4	Additional Frequent Consumption SIEFORES
Time (T)	3 months					
CETES % (TLR)	2.06	2.06	2.06	2.06	2.06	2.06
Nominal Value (VN)	89,813,860,000	119,201,020,000	1,334,154,760,000	1,054,197,090,000	852,147,740,000	87,552,940,000
Bond Price ( $P_B$ )	87,998,883,037	116,792,181,261	1,307,193,886,099	1,032,893,658,298	834,927,363,135	85,783,652,174
Derivate investment (CETE bond profit) ( $VN-P_B$ )	1,814,976,963	2,408,838,739	26,960,873,901	21,303,431,702	17,220,376,865	1,769,287,826
Real profit from the derivate (G)	873,671,061	1,159,536,865	12,978,090,522	10,254,781,284	8,289,331,073	851,677,792
Real profit from the structured note <i>Put Spread</i> $G+(VN-P_B)$	2,688,648,024	3,568,375,604	39,938,964,423	31,558,212,986	25,509,707,938	2,620,965,619
Asset Final Result ( $VN+G$ )	90,687,531,061	120,360,556,865	1,347,132,850,522	1,064,451,871,284	860,437,071,073	88,404,617,792

Source: Self-made through Excel 2016.

Table 14: Net Assets for AFORE and SIEFORE (millions of pesos at the closing of June 2019)\*

AFORE	SB0	SBI	SB2	SB3	SB4	SA	TOTAL
XXI-BANORTE	18,401.44	27,676.32	332,705.43	226,388.74	141,319.52	81,046.03	827,537.48
CITIBANAMEX	10,392.01	13,393.64	206,964.46	202,397.09	235,231.21	529.86	668,908.27
SURA	10,373.75	11,976.51	212,469.63	176,248.69	131,633.33	2,540.73	545,242.64
PROFUTURO	12,796.70	17,801.92	228,670.47	190,927.72	89,222.73	8,749.35	548,168.89
INVERCAP	2,674.88	3,277.94	69,378.60	64,313.98	38,866.74	0.00	178,512.14
PENSIONISSSTE	23,451.60	24,471.17	77,164.86	45,182.74	62,489.85	0.00	232,760.22
PRINCIPAL	5,804.73	10,058.98	109,661.74	77,644.59	39,225.62	0.00	242,395.66
COPPEL	2,582.10	1,880.02	49,130.09	55,995.80	120,351.91	0.00	229,939.92
INBURSA	1,810.21	6,054.61	67,065.63	35,524.64	15,079.37	0.00	125,534.46
AZTECA	1,629.03	1,742.18	28,468.65	28,796.91	33,104.25	0.00	93,741.02
SUMA	89,916.45	118,333.29	1,381,679.56	1,103,420.90	906,524.53	92,865.97	3,692,740.70

\*Amounts calculated according to bonds pricing for SIEFORE, as registered at the Mexican Stock Market on the last day of the month, and which correspond to the accountable information of the penultimate day of the month.  
Source: Self-made with information from CONSAR (2019c).

Table 15: Composition of Investment Portfolios of SIEFORES  
(percentage with respect to the administered portfolios)

Type of instrument	SB0 %	SB1 %	SB2 %	SB3 %	SB4 %	SA %	Total %
Governmental Debt in Pesos	100.0	64.30	53.60	51.20	46.80	72.60	53.10
Governmental Debt in Foreign Currency	0.0	0.70	0.60	0.90	0.80	0.10	0.70
Airlines	0.0	0.10	0.00	0.00	0.10	0.00	0.00
Food	0.0	0.60	0.90	0.90	0.70	0.00	0.80
Vehicles	0.0	0.10	0.20	0.20	0.30	0.10	0.20
Development Banking	0.0	1.80	1.40	1.10	0.90	0.90	1.10
Banking	0.0	1.80	1.30	1.20	1.10	0.70	1.20
Drinks	0.0	0.80	0.0	0.60	0.50	0.20	0.60
Malls	0.0	0.10	0.10	0.10	0.10	0.00	0.10
Consumption	0.0	0.30	0.30	0.30	0.50	0.10	0.30
State Productive Companies	0.0	3.90	2.80	2.50	2.20	1.90	2.50
States	0.0	0.80	0.40	0.30	0.20	0.40	0.30
Euro pesos	0.0	2.90	2.80	2.60	2.40	0.60	2.50
Industrial Groups	0.0	0.80	0.60	0.60	0.40	0.00	0.50
Infrastructure	0.0	5.10	4.00	3.80	4.50	1.20	3.90
Real Estate	0.0	0.00	0.00	0.10	0.10	0.00	0.10
Others	0.0	1.20	1.00	0.90	0.80	0.40	0.90
Paper	0.0	0.10	0.10	0.10	0.00	0.00	0.10
Financial Services	0.0	0.40	0.40	0.40	0.50	0.10	0.40
Telecom	0.0	1.20	1.20	1.00	0.90	0.10	1.00
Transportation	0.0	0.40	0.50	0.50	0.60	0.00	0.50
Household	0.0	2.10	1.30	1.20	1.10	0.90	1.20
Structured Products	0.0	0.90	6.00	7.30	6.40	0.10	6.10
Fibers	0.0	1.70	2.50	2.40	2.50	1.80	2.40
Varied Rents	0.0	2.20	5.20	6.00	8.20	4.40	5.90
International Debt	0.0	2.00	1.30	1.10	1.40	0.00	1.20
International Variable Rent	0.0	3.60	10.90	12.50	15.60	13.10	12.10
Goods	0.0	0.00	0.20	0.30	0.30	0.40	0.20
Total	100.0	100.00	100.00	100.00	100.00	100.00	100.00

Amounts by the closing of June 2019.

Source: CONSAR (2019c).

To sum up, Table 16 shows a comparative of the monetary differences regarding the obtained results and the real values shown by CONSAR for each SIEFORE at the closings of the first and second trimestre of the current year.

Table 16: Monetary differences at the first and second trimestre of 2019 at SIEFORES (amounts given in millions of pesos)

Concept	SB0	SB1	SB2	SB3	SB4	SA	TOTAL
Real Differences	102.58	-867.74	47,524.80	49,223.82	54,376.77	5,313.02	155,673.25
Material Differences	7,879.96	10,458.30	117,054.35	92,491.80	74,764.62	7,681.60	310,330.62
Industrial Differences	762.34	1,011.78	11,324.45	8,948.15	7,233.10	743.15	30,022.98
Financial Differences	1,659.43	2,202.39	24,650.35	19,477.76	15,744.59	1,617.65	65,352.16
Frequent Consumption Differences	873.66	1,159.53	12,978.09	10,254.79	8,289.31	851.67	34,407.05

Source: Self-made through Excel 2016.

At Table 16 we can appreciate that for all types of SIEFORES, investment in the Materials Sector showed better results. Profits in comparison to the previous trimestre were higher, with a total profit of 310,330.62 million Mexican pesos (double as much given by CONSAR through assets diversification). Also, in all other cases shown in each of the sectors, we can observe that for SB0 and SB1 major profits than those given by CONSAR were obtained. For the other SIEFORES, there was no loss. Whereas CONSAR shows loss at SB1 for nearly a thousand million pesos, a worrying situation as in this SIEFORE resources from sixty-year-old and older workers are invested. Should the same methodology continue, that amount may be extrapolated trimestre after trimestre.

## CONCLUSIONS AND FINAL REFLECTIONS

Article 18 of the CONSAR Law establishes that administrators should perform all necessary arrangements to obtain adequate profitability and security in investments within societies that manage them. As given by their mission, they should exclusively provide major interest to workers and secure that all operations for the investment of the resources are performed with that in mind.

We should be focused on the fact that current and future Social Security for the worker represents a Human Right. Their future life quality depends on that, and administrators should not only be seeking to obtain better yields, as they are obliged by the law seeking security and yielding. They should prove to be making the best investments. According to the people protection principles granted by the constitutional obligations of protection of human rights, administrators should act under such premise.

As we could observe in the backgrounds of the creation of the individual capitalization system, one of the main arguments for approval is the actuarial unbalance provoked by the changes in the number of retired people and active workers, added to the fact that it was stated that AFORES could make that the savings from workers would have great benefits after being invested. Thus, the need to find procedures to achieve a major benefit. There should be procedures which increase the yielding of savings, as shown in the proposed alternative of this investigation by using financial Structured products “*Call Spread*” and “*Put Spread*”, as these products are a guaranteed capital and no lose on trimestral initial resources can happen. Major profits to those reported by CONSAR are possible, at least for the closing of the first and second trimestre of 2019 (given by the Materials Sector).

Investing the total amount of resources in financial Structured Products apart from guaranteeing no loss of worker’s resources, a major number of profits for workers in any type of SIEFORE is feasible. Today, the percentage of investment in this type of products is minimal. A diversification of resources in diverse financial product is mostly chosen, risking potential loss on resources from workers, mainly happening today at SB1.

This research empirically demonstrates that at least for the closing of the two first trimestres of 2019, the manner of investment of the resources from workers is less feasible than a total investment of resources in financial structured products. There are special negative effects in SB0 and SB1, which correspond to people who are sixty-year-old or more. It may be concluded that the use of Structured products is possible. Investment results should be increased in this type of financial products that are actually made by CONSAR for each type of SIEFORE. This research has demonstrated that even SB0 registered trimestral losses at the closing of the first trimestre of 2019.

The limitations of this research lie on the fact that the obtained results disregard income from workers during the trimestre. That is, only the profits shown in all cases are the product of yieldings generated by the finan-

cial structured product. Despite this, the information provided by CONSAR for each trimestre considers such information.

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#### **AUTHOR BIOS**

*Héctor Alonso Olivares Aguayo*

Profesor-Investigador de Tiempo Completo en la Facultad de Negocios de la Universidad La Salle-México. Es Actuario y Maestro en Finanzas con mención honorífica por la Universidad Nacional Autónoma de Méxi-

co (UNAM). Sus principales líneas de investigación son: i) Pensiones, ii) Portafolios de Inversión, iii) Economía Financiera, iv) Administración de Riesgos Financieros, v) Ingeniería Financiera y vi) Ciencias Actuariales. Ha publicado diversos libros, capítulos de libros y artículos científicos en revistas indizadas especializadas en Economía Financiera. Actualmente en México es miembro del SNI y del Colegio Actuarial Mexicano, y en Colombia de la Asociación Internacional de Riesgo y Actuaría.

Dirección electrónica: [hectoralonso.olivares@lasalle.mx](mailto:hectoralonso.olivares@lasalle.mx)

Registro ORCID: <https://orcid.org/0000-0003-2609-8627>

*Ana Laura Medina Conde*

Docente-investigadora de la Universidad Autónoma de Tlaxcala, Posdoctorado CONACYT en Derecho de la Empresa en la Universidad de Zaragoza, España, Doctorado en Derecho en argumentación jurídica con mención honorífica y Maestría en Derecho Fiscal por el Centro de Estudios Jurídico Políticos de la Universidad Autónoma de Tlaxcala, Licenciatura en Derecho Civil. Líneas de investigación: Derecho de la Empresa, Derecho Bursátil, Derecho Fiscal, Derechos Humanos. Es autora y coautora de artículos, libros y capítulos de libros, fue Directora de Investigación del Instituto de Ciencias Sociales y Humanidades de la Universidad Tecnológica de la Mixteca, Catedrática de Posgrado y licenciatura en Derecho Bursátil, Derecho Mercantil, Derecho Fiscal y Argumentación Jurídica, en la Universidad Nacional Autónoma de México, de la Universidad de las Américas Puebla, de la Universidad Anáhuac, investigadora de la Universidad la Salle, México y es Miembro del Sistema Nacional de investigadores nivel I.

Dirección electrónica: [analaura.medinaconde@uatx.mx](mailto:analaura.medinaconde@uatx.mx)

Registro ORCID: <https://orcid.org/0000-0003-4203-4383>

*Oscar Javier Apáez Pineda*

Profesor-Investigador de la Facultad de Derecho de la Universidad La Salle-México. Es Licenciado en Derecho por la Universidad Autónoma del estado de Morelos, especialista en Derecho Social y Maestro en Derecho por la UNAM. Doctor en Derecho y Globalización con mención honorífica por la Universidad Autónoma del Estado de Morelos. Ha publicado diversos libros, capítulos de libros y artículos científicos en revistas indizadas especializadas en Derecho. Actualmente es miembro del SNI y del Colegio de Profesores de Derecho del Trabajo de la UNAM, académico de número de la Academia Mexicana de Derecho de la Seguridad Social y

miembro honorífico del Panel Disciplinario del Comité Nacional Antidopaje (MEX-NADO). Además, es líder responsable del Grupo de Investigación Desarrollo e Innovación: Estudios sobre Justicia Social, Pobreza y Desigualdad de la Universidad La Salle, México.

Dirección electrónica: [oscar.apaez@lasalle.mx](mailto:oscar.apaez@lasalle.mx)

Registro ORCID: <https://orcid.org/0000-0003-2865-2740>