

Performance Valuation of Romanian Mutual Funds Market during 2007-2015 Using Data Envelopment Analysis Methodology

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Abstract: The research enhances the investment funds efficiency analysis within a new founded method that has not yet been applied for the Romanian market. Consequently, the study provides a novelty approach of performance evaluation of mutual funds using the non-parametric method of Data Envelopment Analysis – DEA analysis. This research approach is significant as there were fewer studies that have included the local industry on the map of the global investment funds market. It becomes one of the studies that observes the main development areas of the national investment funds industry. As well, the research outlines the industry's redimensioning trends and sets a pillar for the local literature. Therewith, our approach gains relevance as it provides relevant alternatives in boosting the economy through this investment vehicles – by funding companies and simultaneously by supporting economic growth. This topic is attractive for the latter researches as mutual funds issues (dynamic, market size, market shares) involve a wide areas of study, industries and countries, enhancing a great significance for both academic literature and global capital market as complex connections are involved between capital allocation, financing decisions and economy.

Keywords: investment funds; DEA; performance evaluation; efficiency and risk measures;

JEL Classification: E22; G23; O11; O16

1. Introduction

Since 1990, the investment fund industry has proven to be one of the components with the highest rate of growth of the financial sector in European countries (Enciu, 2003), becoming in almost all European countries an important way of attracting significant share of the household savings.

Our analysis on Romanian mutual funds industry is spread over a 10 years time period, between 2006 and 2015. The yearly selected interval facilitates the observation of the industry's dynamics – i.e. its upsurge between years 2005-2007, its recessive tear in 2008 and also the post-crisis evolution until end of 2015.

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The financial crisis has stimulated investors refocusing from other categories of funds that have gained ground in 2005-2006 towards the monetary market funds. Consequently, the money market funds grew up to a number of five funds in 2009 and to encompass 53,35% of the managed assets. The connection of money market funds with the banking sector (i.e. 5 local banks) has impacted the monetary market revival starting with year 2007. In addition, money market funds like BCR Monetar and Raiffeisen Monetar came to attract the largest number of investors in 2009-2010 (about 6 times higher in 2009, and by 10 times higher in 2010 than in 2008).

Given the complexity, timeliness and the continuous dynamics of investment funds market, this research adds a significant scientific contribution to the theoretical literature and provides realistic solutions for the interested parties. The carried approach creates value added by the fact that our study is a first step in assessing the determinants of market development Romanian investment funds in exposing an assessment model state of the industry and hence presents the current maturity level of the national market. However, the usefulness and originality lies in deepening the study in the Romanian market. More specifically, the undertaken analysis, rigorously structured reveals the local investment funds market attractiveness and sets its place in the global market in line with the countries with medium to high investment attractiveness.

2. Evidence on Romanian Mutual Investment Fund Market Context during Analyzed Period

Despite of the global economic recession period, Romanian investment fund industry recorded a growth rate supported in the number of investors, in the number of emerging market funds and as well with the increase of the managed assets. Moreover, starting with 2009, the mutual fund industry in Romania recorded the highest annual growth rates in the total assets, so in 2014 reached to a middle position in the European market, being ranked 13th of 28 European countries.

More exactly, starting with 2008, 11 new mutual funds and 5 new close-end funds gradually attracted new subscribers, so in 2014 reaching to comprise about 309.000 investors within 98 domestic funds (71 open and 27 closed). Besides these domestic mutual funds, AAF reports the presence of a significant number of foreign mutual funds. The number of foreign investment funds has been also annually increasing with an average of 15%, reaching today to equal the number of mutual funds, as evidences by Chart 1.

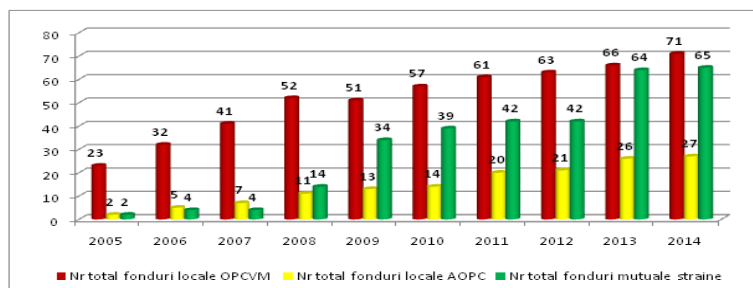


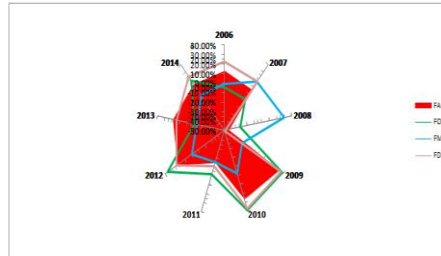
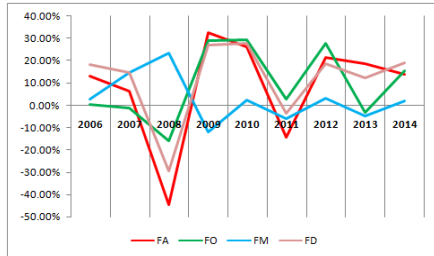
Chart 1. Structure of the Romanian investment fund market

Source: Author's own processing using AAF, CNVM și ASF statistics

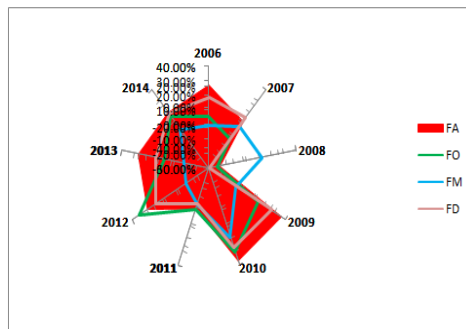
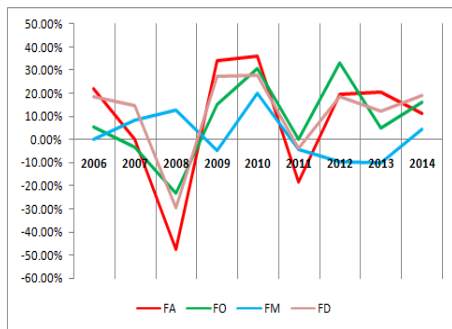
Of the total net assets managed by the Romanian investment funds, mutual funds have administered an average quote of 81% throughout the reviewed period, while closed investment funds managed the remaining 15%. Increasing the value of total net assets across the Romanian investment fund industry to 5.622 million RON (about 47 times higher than the total assets amount managed by the 21 funds in 2003), it was done mostly due to the new capital inflows of 2008-2010.

We find that the last 10 years have been very active for the domestic investment funds market. Following the observed ascendent trend – in their number and in the total of the managed amounts - we can say that at the end of 2014, the industry was stimulated by the fact that total assets multiplied 43 times and the number of investment funds increased by 4 times the situation of 2005. Moreover, as proof of the Romanian capital market's increasing attractiveness and openness, a significant number of foreign funds are active lately on the local market (e.g. from a number of two foreign mutual funds in 2005 up to 65 foreign mutual funds in 2014). As a consequence, all capital inflows of 2014 (approximately EUR 1 billion) and total net assets of over 5.7 billion EUR (5.717 million euros), ranked Romania as being the 13th state in Europe, standing at mid-table EFAMA of the 28th Member States.

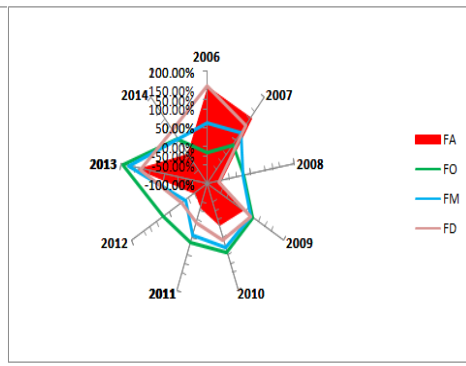
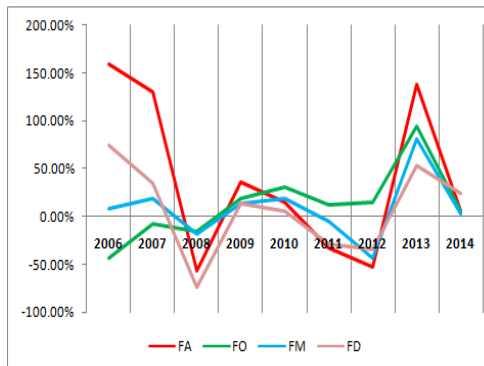
Conducting an analysis of cycles for the Romanian mutual funds market experienced during 2006-2011 period (using quarterly observations), we find a strong cyclical behavior modification of the total assets managed by equity funds and money market funds. Their trends are opposites, while bond funds show low intensity fluctuation and balanced funds retain a steady evolving, as shown in chart 2.



Total net assets per type of funds - European overview



Total net assets per type of funds – ECE overview - 2005 - 2014



Total net assets per type of funds – Romanian market overview

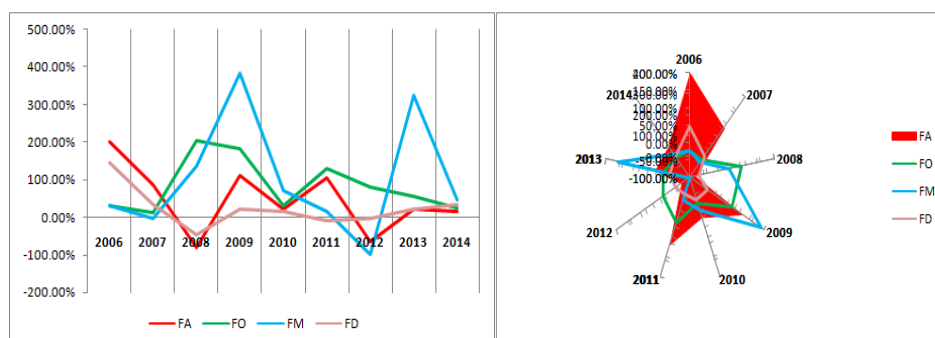


Chart 2. W dynamics of the mutual funds market during financial crisis period. Total net assets per type of funds - global overview

Source: Author's own processing using ICI, EFAMA and AAF data

With different amplitudes, the above records present a W trend for all investment funds in the same period of time i.e. 2008-2011 for global and European perspective, while in case of CEE and Romania's analysis destabilizing impact was registered during 2012. Taking advantage of the expanding equity market, Romanian equity funds were favorites in investors' allocations. Thus, it appears that the most dynamic sector of industry - equity funds - showed a significant tightening in 2007-2009 and 2011-2012, in conjunction with the relaunch of low-risk funds (money market and bond funds) as alternatives to preserve investors' portfolios.

Summarizing the conducted analysis of the Romanian mutual fund industry's indicators during period 2005-2014, the results are the following:

- average investment per investor in the total open-end funds was around 29 thousand RON, with 17% greater than the average achieved in 2010;
- net capital inflow was at 993 million lei, realizing amid underwritings of over RON 5.727 million and repurchases of over 4.734 million lei;
- during 2013-2014, within the Romanian capital market there were 60 active mutual funds of which 20 bonds funds, 18 diversified funds, 17 equity funds, 1 money market funds and as well, other funds classified under "other funds";
- the number of investors in domestic mutual funds has significantly increased in recent years, reaching the level of 271.547 investors in 2013, with 12.46% more than in 2012. Of these, 9822 were institutional investors, increasing by 10.22% compared by 2012;

- the total net assets amount of domestic mutual funds by the end of 2011 was 6.780 million, which means an increase of 19.11% from the level recorded at the end of 2010;
- the growth rate of total assets of mutual funds experienced the same dynamic that the entire market, making it dominate of the market. Here we must recognize the significant share held by the five SIFs;
- under an inflation which fell below 1% in 2014 and quotas of bank interest rates below 2%, mutual funds have continued to develop drawing last year net subscriptions of nearly EUR 1 billion, reaching a level of assets of approximately EUR 4.4 billion and over 300,000 individual and institutional investors;
- the investors distribution among different fund categories shows that there is a concentration of attractiveness to funds with an investment policy geared towards fixed income instruments (e.g. bond funds). According to ASF data (2014), bond funds represented approximately 94.42% of the total assets managed by investment trusts Romanian.

Last 4 years demonstrated that Romanian capital market has joined European competition, reducing the fragmentation of the market from regulatory institutions unification of entities active in the capital market under the FSA. At the same time, adapting national legislation to the European legislative framework has allowed the removal of discriminatory barriers between EU states, allowing access and authorization of foreign investment vehicles on the local market, while outsourcing national funds in the foreign market.

We found that in the last period, the industry investment fund in Romania has registered a sustained rate of growth (both in the number of funds active in the market and the value of total assets managed by them), without being strongly affected by the contagion of latter economic crisis. Thus, despite the inconveniences arising on the global stock market in 2008, Romanian mutual funds recorded increases of over 86% up versus 2005 status, mainly due to rising capital inflows into equity and diversified funds.

3. DEA Empirical Analysis

3.1. DEA Benefits

Empirical investigations using the multifactorial regression models and Data Envelopment Analysis method have substantially complemented our study and their results are significant in outlining the development of Romanian investment funds.

In the first part, the developed econometric model, quantifies and explains the performance of the Romanian mutual funds considering an eight indicators panel data within a monthly evolution between time period 2006-2015, distinctively for equity funds and balanced funds market. The driven results consistently demonstrate a significant positive effect of the NAV persistence, risk and return's rate, market share and market conditions over the Romanian investment funds total net assets growth. On the other hand, the reduced historical evidences and investor's moderate financial literacy have become factors that are dampening investment funds dynamics.

In assessing the performance of mutual funds, DEA approach consists in building performance indices and scores by incorporating multiple factors of input and output variables within the model. Namely we refer to:

- inputs (fed into the model as variables of effort) i.e. cost of funds (redemption fees, consultancy fees, administrative expenses, operating expenses, etc), measures of risk (market volatility and dispersion of returns) and valuation of funds sizing (market share, the volume of total assets managed and their inflows);
- outputs (described as results) i.e. expected return or expected yield in excess of the risk free rate, stochastic dominance indicators and performance indices (Sharpe, Traynor, Jensen α), all properly correlated with the investment funds type that they are influencing.

Following advantages of DEA usage are appropriate in evaluating the efficiency of mutual fund market:

- non-parametric method based on mathematical linear programming technique, which does not take into account the random estimation errors nor their distribution;
- DEA measures the performance of a fund in relation to its category best performance and reporting them against a "best results frontier border";
- provides information on the causes of inefficiency funds, devising ways to divert funds to optimum efficiency;
- offers improvement alternatives for each input-output variables by marking the efficiency border in relation to the fund with the best results.

The exposed benefits of the DEA method will ensure effective identification of the investment funds in each analyzed category or within the entire market, so it will facilitate the capital allocations orientation toward investment alternatives with the best yields and thus protecting inefficient capital of those variants.

3.2. Data and Methodology Review

In order to define the efficiency of investment funds in Romania per category of funds, we investigated a sample of 82 investment funds (52 mutual funds, 15 closed-end funds and 15 foreign funds) through an input oriented DEA model for which we have considered both hypotheses i.e. with constant returns to scale (CRS) and variable returns to scale (VRS). The selected sample represents 44% of the total number of undertakings for collective investment in the Romanian market during 2007-2015 that includes 65% of the open-end investment funds, 38.46% of close-end funds and a share of 22.39% of foreign investment funds. Instead, by referring to the number of investment funds existing at the level of 2014 (a total of 144 funds), the sample comprises a majority of 56.94%. The efficiency indicators of investment fund records were reported considering the literature evidences (Eling, 2006; Babala et al., 2009; Roman, Suciu, 2013; Manta & Bădircea, 2014) and their dimensioning was defined by cost and risk indicators for inputs and result indicators for the output variable. The inputs of the model are defined by indicators that cover up the vector “risk - cost – size” being symbolized with I1, I2 and I3. They are represented differently for each category of funds in relation to the most representative elements. The outputs of the model are indicators that describe the “effects or the results” which we consider appropriate in sizing the risk-adjusted performance (i.e. Sharpe ratio, Treynor and Jensen) with respect to each of the analyzed funds. (i.e. FDA, FDD, FDO) The structure of the models is briefly evidenced in table 1.

Table 1. Input – output variables of DEA efficiency testing model

FDA efficiency testing model		
Input		Output
I1: Cost index I_c I2: Risk elements σ^2, β I3: Size measures: <i>market share, lnNAV, $\Delta\%NAV$</i>	↔	O1: Risk-adjusted performance measured through Jensen/Treynor/Sharpe rates
FDD efficiency testing model		
Input		Output
I1: Cost index I2: Risk elements σ^2, β I3: Size measures: <i>market share, lnNAV, $\Delta\%NAV$</i>	↔	O1: Risk-adjusted performance measured through Sharpe and Treynor rates
FDO efficiency testing model		
Input		Output
I1: Cost index I2: Risk elements σ^2 I3: Size measures: <i>market share, lnNAV, $\Delta\%NAV$</i>	↔	O1: Risk-adjusted performance measured through Sharpe rate

Source: Author’s own processing

By analyzing the correlation matrix of the risk and cost indicators, we found that there is a strong correlation between them which favors the construction evaluation model taking into account a 4 indexes structure based on three inputs and one output.

To establish a common evaluation score, we proceeded to use a measurement scale in order to define the effectiveness (Table 2.):

Table 2. Efficiency scale

Calculated scores	Evaluation	Symbol
SE ≥ 80%	High efficiency	✓
80% ≥ SE ≥ 50%	Above average efficiency	!
SE ≤ 50%	Poor efficiency	✗

Source: Author's proposal

Assessing the effectiveness of Romanian investment funds during 2007-2014 period needed a divided analysis within three groups e.g. mutual funds category (i.e. UCITS), close-end funds (non-UCITS) and foreign funds investment funds (abr. FS) all being present and authorized to operate on the market in Romania. By applying DEA evaluation model of efficiency the analysis will be orientated towards identifying the best performing fund category and the funds with the best results obtained during the last 7 years for each category of these three.

3.3. Results

The usage of DEA methodology applied within input oriented variant has outlined, as expected, the same trend observed in assessing the performance of funds. The mutual funds' performance is marked by the financial crisis between the years 2008- 2011, thus, amid retraction of the market the efficiency scores follow the same trend.

Table 3. Efficiency scores per investment funds categories

Ani	OPC Romania				OPCVM				AOPC				FS			
	CRS	VRS	SE	SI	CRS	VRS	SE	SI	CRS	VRS	SE	SI	CRS	VRS	SE	SI
2007	100%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	0%	100%	100%	100%	0%
2008	0%	19.30%	0.10%	19%	0%	25.10%	0.00%	25%	0%	83.90%	0.12%	84%	0%	20.00%	0.00%	20%
2009	0.20%	88%	0.20%	88%	0.10%	100%	0.10%	100%	0.00%	87%	0.00%	87%	0.30%	100%	0.30%	100%
2010	55.10%	59%	86.30%	4%	45.30%	100%	45.30%	55%	45.80%	100%	45.80%	54%	79.90%	100%	79.90%	20%
2011	5.80%	84.60%	6.40%	79%	2.40%	100.00%	2.40%	98%	2.20%	49.10%	4.48%	47%	17.20%	100.00%	17.20%	83%
2012	11.50%	62.90%	13.20%	51%	5.90%	61.90%	9.53%	56%	3.30%	57.80%	5.71%	55%	44.60%	100.00%	44.60%	55%
2013	71.50%	100%	71.50%	29%	42.30%	100%	42.30%	58%	37.20%	65%	57.23%	28%	100.00%	100%	100.00%	0%
2014	51.90%	100%	51.90%	48%	35.60%	100%	35.60%	64%	6.00%	70%	8.53%	64%	91.30%	100%	91.30%	9%

Source: Author's own calculations

DEA investigation reached to report the following remarks:

- effectiveness analysis of the collective investment undertakings in Romania during 2007-2014 was the most fruitful period time in terms of the overall market results, while 2009 and 2011 generated the highest scores of inefficiencies;
- the latter financial crisis has opened investment fund market in Romania for foreign markets as international investment funds succeeded to manage a great part funds over the local market. Pioneer funds are the best example of foreign investment funds that have been very active within the domestic market during 2008-2014 offering high return rates;
- economic decline of 2009 (-6%) has not fully destabilized the investors' confidence in the Romanian collective investment schemes, keeping for them an average level of efficiency of over 80 %;
- closed funds shares, except SIF and FP, proposed also good yields like Certinvest Arta Romania, Certinvest Leader, Hermes and Matador, being able to offer better yields than common funds (following as if the years 2009 and 2013).
- compared with the best yields we identified the followings:

<i>Mutual funds</i>	<i>Best performance funds</i>
Equity funds	Carpatica Stock, OTP Avansis și Erste Equity Romania
Balanced funds	BT Clasic, Carpatica Global, OTP Balansis
Money market funds	Bancpost Plus, iFond monetar, Erste Money Market RON
Bond funds	BT Obligațiuni, Certinvest Obligațiuni, Orizont și Stabilo

- mutual funds have been pretty volatile being marked by a strong dropdown in 2009 and 2011, but have managed to adjust a place on the efficiency frontier of the Romanian market above average.

3.4. Research Limits

Due to the complexity of efficiency concepts, the literature has not reached to identify and to appreciate the complete economic efficiency through a single indicator. Therefore, our results will be limited to these two methodologies and will cover only the Romanian market segment of mutual funds during the analyzed period.

4. Final Remarks

Last 10 years have proven that Romanian capital market has joined European competition by reducing its fragmentation by unifying the regulatory institutions under the FSA (starting with 2011). Adapting national legislation to the European legislative framework has allowed the removal of discriminatory barriers between EU states, allowing access and authorization of foreign investment vehicles on national territory

at the same time national funds have been outsourced in the foreign market. Consequently, the Romanian investment funds market has been sustained with a constant growth rate both in the number of active funds and in terms of the total managed assets, without being affected by the financial crisis contagion.

Although the macroeconomic context has imposed a resizing effect to the national market of investment funds, we have identified that the market is following an upward trending to maturity. By acceding its status from frontier market into emerging area, Romanian mutual fund market was reformed and as a consequence started to gain capital within market competition.

The undertaken documentation during this research period has shaped a comprehensive study on evaluating the Romanian mutual fund market size and identifying the potential growth of this industry. In our opinion, the Romanian market offers various opportunities as it provides positive signals in attracting investors from both local and foreign markets as long as the domestic market was preferred and halted during recession time against other developed economies.

Motivated by the fact that not very numerous researches have been carried out over Romanian mutual fund market, we have undertaken this current study in terms of evaluating the radiography of the domestic market in order to understand the implications of these investment vehicles. Thus, the conducted research over the last 10 years' evidences is significantly contributing to mutual funds research literacy within the following inputs:

- applying and adapting a consistent and wide sample of methods and quantitative techniques for sizing the Romanian mutual fund market, testing and evaluating performance and identifying the main determinants of investment funds development;
- aligning specific methods of microeconomic efficiency analysis i.e. DEA to assess the best performance alternatives as well as identifying potential optimal portfolios;
- analyzing the most recent data derived from statistical evidences of national regulatory authorities. The included data are comparable to European and international evidences, being reported to statistics of EFAMA, EVCA and ICI.

Under these circumstances, the practical approach of this research is highlighted by assessing the internationalization degree of the Romanian mutual funds market, evaluating its effectiveness analyzing the main driving factors and inhibitors of the investment fund industry in Romania.

The conducted research suggests considering the following aspects in order to attract investors to support national mutual fund market and implicitly the local economy:

- in the coming period, especially on a medium term, i.e. during 2015-2017 period, the major challenge will continue to constitute the national capital market anchoring to the international market while simultaneously supporting the revival of lending activity and rebuilding investors trust into these investment vehicles;

- attracting both domestic and foreign capital within the local investment market becomes the real path towards the consolidation of investment funds while supporting market competition;

- promoting investment funds to individual investors as an alternative to traditional saving forms;

- supporting an active stock market that maintains a direct interaction between capital owners and those in need of resources for business development;

regaining investors' trust in stock market instruments while promoting caution and reluctance of both investors and national issuers as these aspects significantly restricts the liquidity of the market;

- supporting a universal stock market as the next step of market consolidation. Given that the current liquidity is increasing and macroeconomic balance and economic growth are above the EU average, Romania's stock market prefigures truly stable conditions.

We acknowledge that this research is restricted to local market and its results cannot be extended to other markets, but it provides a comprehensive and useful guidance material to anyone interested in investments. At the same time, the theme is attractive to all specialists and this research is foreshadowing a complex radiography of the national investment fund market.

As this topic will continue to be debated, our future studies could be directed towards widening the research on the determinants of efficiency and inefficiency. In this way, we can validate if the current results are relevant and the observed units are truly efficient or inefficient in relation to other investment vehicles.

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