

# A RISK ASSESSMENT FRAMEWORK FOR ALTERNATIVE INVESTMENT FUNDS, BOTH AT FUND LEVEL AND MARKET LEVEL

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## Abstract

In this paper we propose an integrated approach to assessing risk for alternative investment funds, both at micro and macro (market) level. Building upon the experience and practice in European Supervisory Agencies and different National Competent Authorities on assessing risk for other type of financial intermediaries (ex. banks, insurance companies), we construct a risk dashboard for Alternative Investment Funds. Our proposed framework includes multiple categories of indicators and has both a time series approach and a cross sectional approach. At the same time, the proposed risk scoring can be calibrated using mechanically computed thresholds and expert judgment, in different combinations. The result is a new and flexible framework that can accommodate situations when not enough observations are available in the time series to compute mechanically the risk scores. In addition, it serves asset managers for their mandatory self-assessments and market supervisors in making relevant comparisons between the industry participants.

**Keywords:** risk dashboard, alternative investment funds, prudential supervision

**JEL Classification:** G15, G23, G28

## 1. Introduction

Alternative investment funds (AIFs) are relatively new entities in the Romanian financial markets, resulted from a reclassification of the collective investment schemes (CIS) other than undertakings for

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collective investment in transferable securities (UCITS). Until now, new type of undertakings include the closed end investment funds, the five investment firms (SIFS) and the Ownership Fund (FP).

The legal framework for this type of financial intermediaries is new in Romania: Law no. 74/2015 on alternative investment fund managers transposes Directive no. 2011/61/EU on alternative investment fund managers into the Romanian legislation. Also, the Commission Delegated Regulation (EU) no. 231/2013 supplementing Directive 2011/61/EU of the European Parliament and of the Council with regard to exemptions, general operating conditions, depositaries, leverage, transparency and supervision regulates the risk management activity that an alternative investment fund manager (AIFM) must carry out.

According with the mentioned new legal framework, the collective investment schemes that qualify as AIFs registered to the Romanian Financial Supervisory Authority during 2017-2018 and were supposed to fill their first annual reports.

The current legislation on AIFMs fails to present a standardized methodology for assessing the risks an alternative investment fund (AIF) is exposed to, leaving it up to AIFMs/AIFs to develop internal risk assessment models, provided that certain principles and rules are observed.

This derives from the particularities in terms of legal organization and operation of the alternative investment funds industry and implicitly from the impossibility of imposing a standardized risk management model for all types of funds.

Legally speaking, AIFs can come in two organization forms, namely: trading company and civil society. Whereas trading company AIFs have legal personality, civil society AIFs have no legal personality.

Therefore, AIFs organized as trading companies have the option of managing themselves internally or of resorting to external management offered by an AIFM. AIFs organized as civil societies do not have this option, as they are managed only externally by an AIFM.

In terms of risk management, the Capital Requirement Directives (CRD) and Solvency Directive legislative packages provide a standardized approach to market risk, credit risk, and operational risk management, with the final purpose of determining a "solvability

indicator” of the financial entities (e.g.: capital adequacy rate – CRD, solvency rate – Solvency Directive).

The solvency indicator aims at determining the ratio between a) the level of potential losses that could result if the risks of the managed assets are exposed to get materialized, and b) the level of own funds held by those financial entities. Also, besides this solvency indicator, financial entities also determine certain liquidity indicators.

This solvency indicator can be determined only by financial entities that have legal personality or are self-managed, because only these entities have in their balance sheet structure the necessary items to determine own funds (equity), can be affected by a potential bankruptcy and, also, the solvency indicator can incorporate only the categories of financial and operational risks identified and assessed at the level of that entity.

For the other financial entities that are managed externally, due to the organization and operation method, risk assessment mechanisms can be developed only for certain risk categories (market risks and credit risks) and also, to limit the losses caused by those risks, exposure limits to various categories of issuers/debtors, financial instruments and activities can be developed.

Considering the adopted organization form and management method, the risk management system of AIFs can be represented as follows:

- ✓ AIFs organized as trading companies: the market risks and credit risks can be determined for the asset portfolio held by AIFs. The operational risks are assessed:
  - at the level of the AIFM, if the AIF is externally managed. In such situation, the final purpose of the risk management system for the AIF cannot be to simply determine exposure limits to various categories of issuers/debtors, financial instruments and activities.
  - at the level of the AIF, if it is managed internally. In such situation, a risk management system can also be developed, the final purpose of which would be to determine a solvency indicator for the AIF.
- ✓ AIFs organized as civil societies: the market and credit risks are determined for the portfolio held by the AIF, whereas the operational risks are assessed at the level of the AIFM. In this situation, the final purpose of the risk management system for the AIF is simply to establish exposure limits to various

categories of issuers/debtors, financial instruments and activities, with the intention of limiting the liquidity risk, market risk, and credit risk of the countertrade.

In the case of civil society AIFs and in the case of externally managed trading company AIFs, the operational risks are assessed at the level of the AIFM because, at the level of those AIFs, there is no hired personnel and no current activity is being carried out (the four categories of operational risks cannot be assessed). These types of AIFs are only legal forms of pointing out a portfolio of financial assets that are managed by the AIFM according to a set of rules established in a prospectus or in articles of incorporation (depending on the legal form of the AIF).

Civil society AIFs are the method through which several investors are able to participate in an investment strategy materialized in a certain structure of financial assets and with a certain level of the leverage effect, aspects presented in the prospectus of that fund. The portfolio of this type of AIFs is collectively held by investors, each of them holding a ratio of that portfolio, whereas the minimum share of participation in that particular financial strategy is given by the value of a fund unit. The AIFM is responsible for implementing the financial strategy and of building the structure of financial assets by using the financial resources provided by the investors.

The trading company AIF is an entity with legal personality, in which its assets suggest an investment strategy in financial instruments. In the case of this category of AIFs, the portfolio of financial assets is held by that AIF, whereas the representatives of the shareholders (investors) can be organized as a committee that selects and subsequently assesses the performances and costs of the assets management company activity achieved by an AIFM (external management). In the case of an internal management, the representatives of shareholders (investors) shall be organized as a management board or a supervisory board (depending on the management system) responsible for the management of that AIF. The trading company AIF is a hybrid form of organization that borrows features both from civil society AIFs (the attribute of collective investment in a certain structure of financial assets) and from joint-stock companies (legal personality, rights relevant to the shareholder quality).

Considering that in the AIFs industry the civil society contract is the most utilized form of legal organization of funds, the European legislator has imposed in the legislation applicable to AIFMs a series of obligations having to do with the identification, assessment and limitation of risks and, at the same time, left it up to each AIFM to develop its own risk management system.

In this article we propose such a system that could be used both by the industry (at micro level) and by the market regulators (both at micro and macro level) and that has the flexibility to accommodate the difficult situation that characterize the lack of long data series needed in a mechanical calibration of the risk scores.

## **2. Literature review**

After the financial crisis, the newly established European Supervisory Authorities (ESAs) and many National Competent Authorities (NCAs) developed specific frameworks for assessing risks in different areas of the financial sector. The European Systemic Risk Board (ESRB) and the Financial Stability Board (FSB), together with the newly recently created national macro-prudential authorities were involved in harmonizing these practices.

Still, such frameworks are only developed for banks, insurers and to a certain extent to undertakings for collective investment in transferable securities. Given that AIFs are only recently recognized as a specific type of financial intermediaries and that their data reporting only comprise few data points (2014-2017), there is not yet a practice in realizing and publishing risk dashboards for this category. Also, the research in this field is still ongoing.

Most of the risk dashboards published quarterly by macro-prudential and supervisory authorities are based on expert judgement in assigning the risk scores for different categories. In some cases the approach also accommodates a partially mechanical approach for some indicators or categories of risk (ex. European Banking Authority) while others are exclusively based on professional opinion in relation with the evolution of set of key risk indicators (ex. ESRB, European Securities and Markets Authority - ESMA). The Romanian central bank follows a similar approach, with the difference that the risk dashboard is not published separately but is integrated in the semi-annual financial stability report.

The notable exception to the practices described above is made by the European Insurance and Occupational Pensions Authority (EIOPA), which uses a mechanical approach for the publishing of the quarterly European insurance market risk dashboard.

In Europe, ESRB was the first to publish an integrated assessment of the systemic risks in the financial sector (September 2012), at the same time that EIOPA also published the first sectoral assessment for the European insurance market. The first sectoral assessment for the European securities markets was published by ESMA soon after (February 2013).

Since then, the structure and complexity of the risk dashboards published by the supervisory and macro-prudential authorities evolved, accommodating the market developments, relevant new risk themes, incorporating new risk categories and new indicators.

Also, as the research progressed in different macro-prudential areas beyond banks (ex. insurance, asset management, investment funds), special chapters within the dashboards were dedicated to these specific categories of undertakings.

The Romanian central bank started to publish a financial stability report in 2006 but only included the risk dashboard in 2015.

Following the financial crisis many authors were interested to develop or to test the effectiveness of particular financial stability indicators, but the literature related to the development of an aggregated risk dashboard is still not very developed. Only institutions with a financial stability mandate remained interested in developing such tools, mostly for internal use but also to some extent for communicating with the public and the industry about the trends in risks and vulnerabilities.

Eppler and Aeschmann (2008) studied interactive graphic representations (ex. charts, diagrams) that could be applied to risk management. The authors reviewing the existing approaches and contributed to the literature by providing a conceptual framework illustrated with new applications and examples. They also developed a set of guidelines to be used for visualizing risk and to minimize the shortcomings inherent in graphic representations (ex. distortions, manipulations).

Our approach in this paper is, in essence, similar with the work of Scarlat, Chirita and Bradea (2012) who propose a risk

dashboard and a set of key risk indicators focused on enterprise risk management, while our attempt is to build a dashboard not for a non-financial corporation but for a sub-segment of the financial sector – the alternative investment funds.

An important reference in the literature for tools to assess risk over large parts of the financial system is the systemic risk monitor ('SysMo') toolkit developed by Blancher et al. (2013). The authors take stock of the existing systemic risk monitoring tools and systematize them accordingly with the six proposed key criteria. They also formulate suggestions on how to operationalize systemic risk monitoring and propose a systemic risk Dashboard that accommodates various country-specific particularities.

Sarlin (2016) discusses the role of visualization in risk communication as part of the macroprudential oversight and emphasizes the importance of simple representations of complex data.

Doyle et al. (2016) as well as the annual 'EU Shadow Banking Monitor' (2016, 2017) published by ESRB highlight the structural features and the specific risks associated with shadow banking in the euro area, focusing on investment funds proposing indicators to identify and assess vulnerabilities and organizing them in categories.

One of the newest developments related to use of dashboards to monitor financial risks was made in relation with the central clearing parties (CCPs). Huang and Menkveld (2016) proposed a risk dashboard for this type of financial entities, which have become systemically important, with the aim to track their exposures to the clearing members in real time and to offer a decomposition that could enable the entity and its supervisor to be alerted by possible sudden large increases and to identify their causes.

### **3. Proposed AIF Risk Dashboard Methodology**

In Romania the initial AIF population is composed of approximately 20 closed-end investment funds, 5 investment companies and the Ownership Fund.

Taking into account the particularities of this segment of the financial system, we propose a risk dashboard consisting of 8 risk categories, each with several risk indicators (Table 1)

**Table 1**

**The structure of the proposed risk dashboard**

<b>Risk Category</b>	<b>Risk indicator</b>
Macroeconomic risk	GDP gap Credit-to-GDP gap Monetary policy stance Budget deficit Current account deficit Public debt-to-GDP Foreign debt-to-GDP
Market Risk	Equity market volatility Equity market contagion Sovereign bonds yield volatility Corporate bonds yield volatility Monetary market volatility FX volatility Commodities market volatility Net Equity Delta (portfolio's sensitivity to movements in equity prices) Net DV01 (portfolio's sensitivity to a change in the yield curve) Net CS01 (portfolio's sensitivity to a change in credit spreads)
Credit Risk	Sovereign bonds CDS Corporate bonds CDS NFC leverage NFC debt service ratio Households leverage Households DSTI ratio Number of insolvencies
Liquidity Risk	Equity market liquidity Bond market liquidity Cash ratio Liquid assets ratio Portfolio Investor liquidity profile
Profitability Risk	Expenses ratio Gross change in NAV
Interlinkages and imbalances	Portfolio concentration on asset classes Top 5 counterparties (single name) exposures
Complexity	Number of transactions Number of counterparties / issuers in portfolio (single names) Number of (unique) financial instruments in portfolio Use of derivatives (notional as % of total assets)
Leverage	Gross leverage Net leverage

*Source: proposals of the authors*



Some of the risk indicators listed above are author's proposals given their relevance to the AIF sectors, while others are precisely indicators reported by the fund managers according with the Commission Delegated Regulation (EU) no. 231/2013 supplementing Directive 2011/61/EU of the European Parliament and of the Council.

Assigning the risk score for each indicator is done by selecting thresholds from the historical distribution of the values for the respective indicator (all the available data, or at least 20 observations – where available). The risk scores will be standardized to values from 1 to 10.

Since official data reports filed under the provisions of the Alternative Investment Funds Managers Directive (AIFMD) are relatively recent, and still have significant quality issues, in situations where the time series for some indicators are not long enough to allow for statistical derivation of the thresholds, expert judgement is used temporarily (until the necessary data becomes available).

To build a risk score starting from the reported indicators, we looked at the population of funds in comparison with two thresholds and at their cumulated assets as a percentage of the total assets.

This way, each indicator within the 8 categories tries to account for 2 dimensions:

- the absolute level of the indicator at the 10th percentile and at the median and
- the cumulated assets for the funds that communicated values below the two thresholds, from the entire population of funds.

The two thresholds mentioned are:

- threshold 1: P10 = the 10% most „riskier” values reported by the individual funds (10th percentile of the distribution)
- threshold 2: Median = the median of the values reported by the individual funds (50th percentile)

Each threshold received a risk score, computed based on the indicator level versus the quartiles selected and its cumulated assets:

- final score P10 = average (individual score P10, individual score of P10 cumulated assets % of total assets)
- final score Median = average (individual score Median, individual score of Median cumulated assets % of total assets)

The total final score for each risk indicator was calculated as the average of the selected thresholds scores:

Total Final Score = average (final score P10, final score Median)

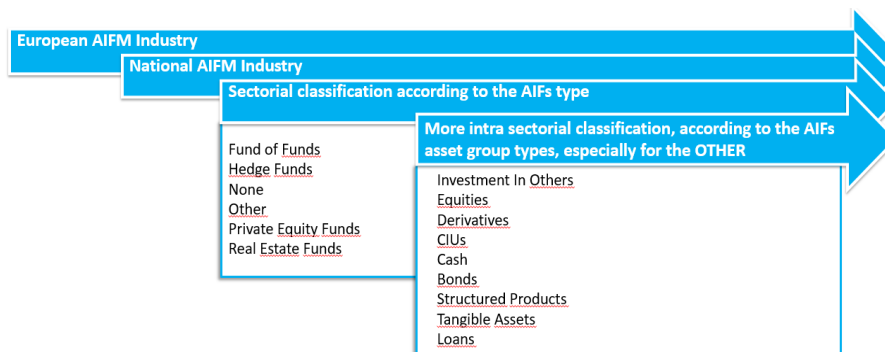
The scores were assigned from 1 to 10, according to the historical distribution quartiles and to the risk direction:

The final score was the average of the 10% percentile and median scores and was ranked from (using 1 digit):

- score 1 – the lowest risk
- score 10 - the highest risk

The general risk framework proposed could be applied from a top-down perspective (Figure 1).

**Figure 1**  
**Top down approach of the proposed risk framework**



Source: proposals of the authors

The result could be exemplified as a risk map based on selected risk categories, that can be monitored evolving in time. The scorings can be also presented in graphical forms.

#### 4. Simulated Data and Results

Because the legislation regarding AIF and their managers is still in process of being implemented, the local entities classified as AIF according to this legislation are still expected to fill their first reports during 2018. As a result of this, we were not able to use actual data in order to test our proposed methodology. Instead, we simulated data starting from stylized facts derived from the reports

filled by the open-end investment funds (classified as UCITS), taking the following steps:

- data was simulated for 100 AIFs and 20 time periods;
- all the indicators were expressed as % of NAV;
- to create the risk scores related to the dimension of the funds, total assets were simulated;
- for the liquidity risk profile, the selected indicators contained several buckets, summing to 100%. the aggregate risk score was a computed as a weighted average of the buckets, putting more weight on the riskiest liquidity buckets;
- the aggregated risk score for each category was computed as a weighted average of the risk scores of the risk indicators are included in that particular category (taking into account the share of total assets invested in each asset class, where applicable);
- an overall risk score for the industry can also be computed as a weighted average of the risk scores for each category.

The resulting evolution in time of the risk scores for each indicator and category can be presented in a table format and illustrated in colour codes as bellow (Figure 2).

Additionally, the evolution in time of the aggregated risk scores for each category can be illustrated using a radar chart (Figure 3).

Figure 2

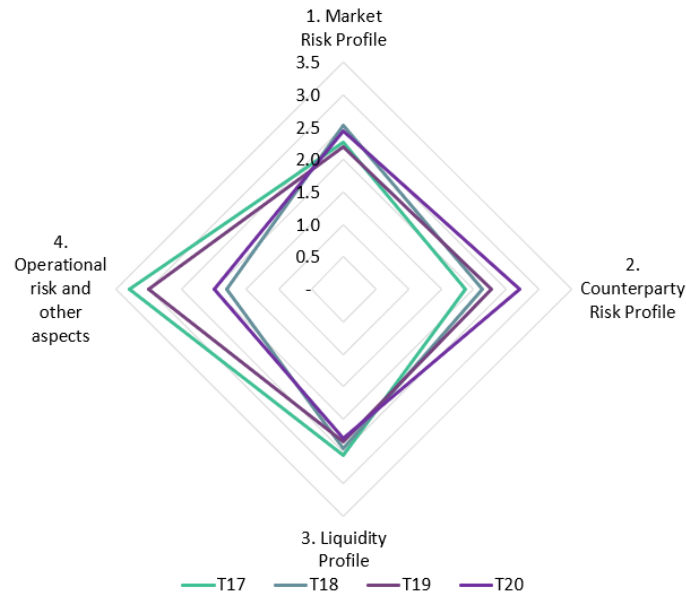
Resulting risk dashboard using simulated data

Time	1. Market Risk Profile				2. Counterparty Risk Profile				3. Liquidity Profile			4. Operational risk and other aspects	
	1.1. Net Equity Delta	1.2. Net DV01	1.3. Net CS01	1. TOTAL (average)	2.1. Value of collateral and other credit support that the AIF has posted to all counterparties	2.2. Top 5 counterparties exposures (including CCPs)	2.3. Direct clearing through central counterparties (CCPs)	2. TOTAL (average)	3.1. Portfolio liquidity profile	3.2. Investor liquidity profile	3. TOTAL (average)	4.1. Change in NAV	4. TOTAL (average)
T1	1.5	2.8	1.5	1.9	2.8	3.0	3.3	3.0	2.5	2.3	2.4	2.5	2.5
T2	3.5	2.5	2.3	2.8	3.5	2.5	2.5	2.8	2.4	2.7	2.6	1.8	1.8
T3	1.5	2.0	1.5	1.7	3.5	2.3	3.8	3.2	2.3	2.7	2.5	3.0	3.0
T4	1.8	2.8	3.0	2.5	2.8	3.0	2.0	2.6	2.5	2.5	2.5	2.3	2.3
T5	2.5	3.3	3.3	3.0	3.0	2.5	2.3	2.6	2.4	2.4	2.4	3.0	3.0
T6	2.0	3.3	3.3	2.9	2.3	3.0	2.3	2.5	2.5	2.2	2.4	2.3	2.3
T7	3.0	2.8	3.0	2.9	2.8	3.3	2.3	2.8	2.2	2.5	2.4	2.8	2.8
T8	2.8	2.5	2.5	2.6	2.8	1.8	1.8	2.1	2.5	2.4	2.5	3.3	3.3
T9	2.5	2.8	3.5	2.9	3.8	3.3	4.0	3.7	2.5	2.4	2.5	1.8	1.8
T10	4.0	3.0	1.8	2.9	2.5	3.5	3.0	3.0	2.5	2.2	2.4	3.0	3.0
T11	3.0	3.0	1.8	2.6	2.5	2.0	2.3	2.3	2.8	2.3	2.6	4.0	4.0
T12	3.0	3.0	3.0	3.0	2.3	1.8	1.5	1.9	2.3	2.3	2.3	2.3	2.3
T13	3.3	3.5	3.0	2.6	2.8	3.0	1.8	1.9	2.4	2.6	2.5	3.5	3.5
T14	2.5	2.0	3.3	2.6	3.0	3.0	3.8	2.9	2.5	2.6	2.6	2.3	2.3
T15	1.5	1.8	1.8	1.9	1.9	1.8	3.3	2.5	2.7	2.4	2.6	1.5	1.5
T16	1.5	2.3	1.5	2.1	1.5	2.0	1.8	1.8	1.1	2.1	2.2	3.0	3.0
T17	2.0	2.3	2.5	2.3	1.5	1.8	2.3	1.9	2.5	2.6	2.6	3.3	3.3
T18	1.5	2.8	3.3	2.5	1.8	3.3	1.8	2.1	2.3	2.6	2.5	1.8	1.8
T19	2.3	2.3	2.0	2.2	2.3	2.0	2.5	2.3	2.4	2.3	2.4	3.0	3.0
T20	2.5	2.3	2.5	2.4	2.3	2.5	3.3	2.7	2.1	2.5	2.3	2.0	2.0

Source: authors' calculations using simulated data

Figure 3

Resulting risk dashboard using simulated data



Source: authors' calculations using simulated data

5. Conclusions

In this paper we propose a framework for assessing risk for the alternative investment funds which are a new sub-category of the financial sector to be created in Romania as an effect of the application of the Commission Delegated Regulation (EU) no. 231/2013 supplementing Directive 2011/61/EU of the European Parliament and of the Council.

Our proposal include a structure of a risk dashboard (a list of categories and indicators), as well as a method to compute the risk scores for each indicator, each category and at aggregated level.

Since in Romania the AIFs are a new category, no reports were yet filled by these entities and as a result no actual data is available to test our proposed method. To offer a glimpse of the possible results, we used simulated data (starting with the stylized facts of the data reported by Romanian UCITS which are somewhat similar in functioning with the AIFs).

The potential benefits of the method that we proposed are:

- it can be implemented „as is” at a low complexity level and gradually developed and extended when more (quality) data is available;
- it can be relatively easy adapted (calibrated) and applied at the same time at European level, national level, sectorial level, fund level;
- selecting and calibrating the risk scores for each indicator can apply both expert judgement (at least in the beginning, before multiple reference dates are available and a time series can be constructed) from an aggregated view of the AIFM industry, or can be fully automated using thresholds derived with statistical calculation applied to the historical distributions of the values of the indicator (when at least 20 observation points are available);
- the method can be applied as soon as the first report filling is available, with a point-in-time approach, and further developed latter from a time series perspective when more reporting reference dates will be passed.

Our proposal could be useful both for asset managers of AIFs, in order to monitor and to compare the risk of their undertakings with the overall industry or with peers, and for industry regulators in order to monitor the risk at micro level (in comparison with the industry average or relevant percentiles) and also at macro level.

The method could be further improved once it will be possible to derive stylized facts of the industry variables, which could also permit to test the relevance of the proposed set of risk categories and risk indicators and if necessary to modify it.

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