

MATRIX FORECASTING TO INVESTIGATE THE CAPITAL EFFICIENCY OF THE INSURANCE MARKET: CASE OF ITALY

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Abstract

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The article aims to verify whether the matrix forecasting method is valid for predicting the insurance market development trends. The methodology is based on the application of the Franchon & Romanet matrix to the insurance market. Our results indicate that the Franchon & Romanet matrix could be usefully employed in the insurance market to identify the initial market position (calculated as financial development potential distributed through the structure of the capital funds available for insurance and financial activities) and the possible future development strategies. The core limits are concerned with the small use of the matrix methods for performance measurement of the insurance market. No empirical study has been conducted. The application of the matrix is concerned with risk management or rating transition matrices. Despite this circumstance gives originality to our paper, it poses a problem of data collection and limits the possibility to conduct the comparison with other scientific results. The construction of the matrix allows identifying the initial position of a country's insurance market, to evaluate the possible development strategies and to choose the preferable ones. The originality of the paper consists firstly, in the innovativeness of applying to the insurance sector the tool of matrix forecasting; secondly, in providing a supporting tool to policy-makers decisions.

Keywords: Insurance, Matrix Forecasting Approach, Financial Strategies

Authors' individual contribution: Conceptualization - I.N.; Methodology - I.N.; Data Analysis - S.D. and S.S.L.; Formal Analysis - I.N.; Writing - Original Draft - I.N.; Writing - Review & Editing - S.S.L. and I.N.; Supervision - S.D. and S.S.L.; Project Administration - S.D. and S.S.L.

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1. INTRODUCTION

The financial institutions are analysed by a wide range of scholars, who investigate different factors influencing their performance (Grmanová & Pukala, 2018; Balcerzak, Klietnik, Streimikiene, & Smrčka, 2017; Jurevičienė & Skvarciany, 2016). However, insurance companies have gained the most

significant attention from researches. Capital efficiency of the insurance market today is considered by market practitioners as a crucial problem to be solved (Lerza, 2016). According to the International Association of Insurance Supervisors (IAIS, n.d.) definition of solvency is the ability of an insurer to meet its obligations to policyholders when they fall due. Solvency includes capital adequacy but also involves other aspects of a solvency regime, for

example, technical provisions, qualitative aspects (such as would be addressed in an enterprise risk management framework), supervisory review, and supervisory reporting (Du Toit & Patchett, 2018). The achievement and maintenance of the financial solvency of the insurer are realised by the planning of insurance premiums, improvement of the structure of the insurance portfolio, and investment activity. Two from the primary processes under the insurance market regulation are insurance services and asset management. However, the precise interaction of these operations is under constant monitoring. Each of them is seen as a source of profits and losses.

The research aims to verify whether the matrix forecasting method theorised by Franchon and Romanet (1985) is valid for predicting the insurance market position and if it can be used to outline the future development strategies. We would validate matrix performance as a useful tool to improve the decision-making for insurance market regulation, directed on insurer capital efficiency (here intended as funds availability) for achieving the balanced positive result of insurance and financial operations. The future market position of a country is characterised by the financial development potential distributed through the structure of the capital funds available for insurance and financial activities. It indicates the coordination of insurance and investment processes, presenting the framework for the forecasting of possible development scenarios of the insurance market. The efficiency of the insurance market is evaluated from the operational perspective, based on the process of organisation the financial flows of the insurer.

Moreover, the matrix approach, justified in the article, is a way of visualisation the past and future levels of insurance and investment activities interaction as well as their interdependence. The greater capital efficiency imposes the higher insurance market potential. The efficiency score in the article is illustrated by one of the matrix position, constructed by the form of the insurance and investment results. Previous studies on the performance of the insurance industry were not concerned with the integrated results of the insurance and asset management activities. The insurance efficiency evaluation in emerging countries is drawing much attention from investors. Thus, the paper consists of the aggregated data for five years comparison of the capital efficiency level for Italy, illustrated with the explanation of capital use. Calculated capital efficiency allows finding out the attractiveness of the insurance business in a particular country from the portfolio perspective. Consolidated result of the investment and insurance activities allow harmonising both operations from a management perspective. The insurance industry is aimed at the appropriate operational efficiency and structure of the business. This will allow the factors of significant influence on both directions of activities.

This choice enriches our research allowing us to test the application of matrix under very different conditions.

The paper contributes mainly to the evaluating of the insurers' strategy by definition the capital availability to cover future investment and insurance activity. By the analysis of Italian insurance

industries, the paper provides empirical evidence on the reliability of the results of financial and insurance performance forecasting. We consider the outputs that could be of great interest to the regulators who are looking for a convenient and transparent concept of providing adequate requirements of insurers' efficiency. The findings can be used to propose a systemic framework for improved performance of the insurance industry.

Results show that the matrix forecasting could be considered a useful tool for the government to reexamine its policy and strategy for future development. The regulator can evaluate financial performance, fix the determinants, and predict their future trends. As well the matrix may serve as the initial evaluation that allows detecting financial problems and the reasons. Each matrix cell was supported by the subjective interpretation and careful explanation of current position judgements and future strategic decisions. The tool description is a supportive rationale to improved policy-makers decisions.

The paper is structured as follows. In the next section, the theoretical background will be discussed to elaborate on the research hypotheses. The sample description and methodology will be presented in Sections 3 and 4, respectively. The empirical results and the discussion of the main findings can be found in Section 5, while the last section provides the conclusions, the implications, and future research lines.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This research is based on the approach, developed by the French scientists Franchon and Romanet (1985), who built a matrix-line tool that was aimed to develop future strategies to the entrepreneurs. The matrix visualises the interrelationship between main business activities of the industry and led to the final result which can be achieved in incremental steps.

The ongoing matrix application is illustrated in the sample of the insurance industry of Italy. The primary attention is devoted to the successful management efforts for position transformation. Transformation of implementation of a change can be presented by the view of Nadler and Tushman (1989) as the process of moving towards a desired future state. The desirable state shows how the industry should function after the change initiative has been implemented correctly. A wide range of approaches to visualise and evaluate the elements of the entrepreneurial strategy based on the company's main business activities have been developed according to Beer and Nohria (2000). For the insurance company, we consider her main businesses like insurance and financial and apply the tool of Franchon-Romanet as a matrix of financial strategy.

The definition of the financial strategy of Landa and Polák (2008) states that it is a relatively coherent and interconnected set of strategic financial objectives, criteria, and rules, that underlie such planning. The main stages of financial strategy are following (Calandro & Flynn, 2007): 1) strategy formulation or the determination of how to satisfy customer preferences in unique ways; 2) resource

allocation, or the process of funding and staffing strategic initiatives that are tied to delivering customer satisfaction; 3) performance measurement, or an assessment of the relative success or failure of business activities. According to Bender and Ward (2012), the financial strategy has two components – the raising of the funds, needed by an organisation, including the decision to reinvest or distribute any subsequent generated. The primary purpose of setting up the financial strategy is to find the balance among controlling mechanisms, high company performance, and minimising the costs of financial operations to reach the effective management of all the mentioned financial areas (Irwin, 2005). The financial stability of the insurance industry is a core task of each economic macro-policy. The final result depends on the allocation of the companies' resources and reduces uncertainty in the development strategy (Alves et al., 2015).

The matrix tools are widely used in risk management, as well as on the governmental level. Namely, publishing the Australian risk management "Guide for business and government", which is complement with the Australian and New Zealand Standard for Risk Management, AS/NZS 31000:2009 and International Standard (AS/NZ 31000:2009; MITRE Risk Management Toolkit). It is widely applied in the public and private sectors to guide strategic, operational, and other forms of risk management. The use of such risk matrices is deducted for setting priorities and guide resource allocations (Cox, 2008).

For planning strategy in the insurance industry the respondents' inquiry for the influence of 10 competitiveness factors related to market performance, enhanced opportunities, and profitability were used, which are: customer care, structural changes, strategy type, marketing effort, product strategy, insurance process management, reputation, organisational redesign, expense management, distribution strength, staff skills (Petroni, 2000; Steinle & Eggers, 1994).

Evaluation of the insurance companies' financial performance was fulfilled by Sharma, Jadi, and Ward (2018). Specific literature is deducted from the Rating Transition Matrices (RTM) application for financial companies (Stefanescu, Tunaru, & Turnbull, 2009; Hill, Brooks, & Faff, 2010; Malik & Thomas, 2012; Tamegawa, 2016). The principle of its use is based on the perspective that moves to another grade. Wang & Carson (2014) monitored rating transitions for US insurance companies and establishes that insurer rating changes differ across economic and industry cycles, while assessment of an insurer's creditworthiness was conducted by Frydman and Schuermann (2008). For financial advisors, management, and business entities and regulators, it is essential to use a comprehensive evaluation tool. However, the rating process is not transparent, and their analysis and determinants are not available to the public (Sharma et al., 2018). The research on the sample of the UK insurers led to the conclusion that general insurers demonstrate a higher level of rating grade variation. Mehari and Aemiro (2013) emphasised that it is vital to research the determinants of the insurer's performance.

Peculiarities of financial intermediaries in the provision of service are as follows (Saunders & Cornett, 2018):

1. Information costs and transaction costs are usually lower because of economies of scale.

2. The ability to provide financial claims to household savers with superior liquidity attributes and with lower price risk.

3. Financial institutions can better bear the risk of mismatching the maturities of their assets and liabilities.

4. Financial institutions are often viewed as the significant and sometimes only source of financing for a particular sector of the economy.

5. The financial institution is able to transfer wealth from one generation to another.

There are four primary financial stability measurement approaches defined by International Association of Insurers – single factor-based, risk factor-based, scenario-based, and principle-based (Zariņa, Voronova, & Pettere, 2018).

Therefore, based on these arguments, the research hypotheses are as follows:

Hypothesis 1 (H1): Matrix of Franchon & Romanet application for the insurance market is valid and it can be used to predict future strategies.

Hypothesis 2 (H2): There is a dependency between an insurance business and financial business results, on the one hand, and funds availability, on the other.

3. RESEARCH METHODOLOGY

Insurance industry work in an uncertain environment. Therefore, an industry development strategy should be based on monitoring and constant analysis of the insurer's situation in a competitive environment, that is, the regulator needs to determine the strategy of choosing the prospects of the financial condition and potential of the insurers, as well as determining the directions for their improvement. Taking one or another strategy, depending on the financial positioning, the insurance industry adapts to a changing environment, resulting in the formation of new effective tactics.

Financial positioning that is, the definition of its financial status in accordance with the criteria allows to make quality regulative decisions and as well may be used by the managers of the insurance company. From achieving the economic effect, the necessity and expediency of financial positioning are conditioned by the processes of development, integration, growth of the insurance market.

To make such a positioning allows using the matrix of financial strategy method. The management of assets and liabilities of an enterprise using this method is applied in the theory and practice of financial management. The evaluation of capital efficiency, which is the sum of the results of insurance and financial activity, allows not only to assess the aggregated state of the industry but also to identify possible directions for further movement. As a financial strategy, we consider the system of long-term tasks of its financial activity, and the directions of the most effective ways of its realisation. In today's business environment, there are different approaches to analyse the financial implications of using different strategies. Some approaches allow concerns about the analysis of scenarios for future activities with the introduction of specific determinants. In this case, the

conclusions can be useful and used only in a situation where the constructed script is correct.

The distinct approach allows using the stochastic simulation principle to build an empirical function for the distribution of crucial financial indicators. The application of the matrix of a financial strategy does not imply the construction of distribution functions but allows managerial positioning. The positioning in the matrix takes place in squares that characterise the state of equilibrium, stable and unstable equilibrium, the rise in activity, the limits of stability, the maximum financial development potential, insufficiency of financial resources in the pre-crisis and crisis.

The activities of the insurance industry are, first of all, economic activity. Therefore, the division of activities into insurance and finances is conditional. Determine which components, taking into account the specifics of insurance activity, can be attributed to the results of economic activity.

The insurance company receives income due to the insurance premiums of insurers. The higher the insurance premiums, the better the insurance company operates, the more powerful and financially sustainable it is. Insurance premiums are the basis for the formation of an insurance fund, that is, the source at which expense in the future carries out insurance indemnity. That is, we can assume that the more an insurance industry received insurance premiums, the more influential the insurance fund it has formed, the better it will be able to fulfil its responsibilities. Taking insurance of one or another risk, the insurer estimates them in terms of the probability of occurrence of insurance cases. The probability of occurrence of insurance cases is laid down in the tariff for insurance service. Besides, the probability of occurrence of insured events is closely linked to the insurance payments and determines their volumes. The worse the loss factor is taken into account, the higher the insurance payments can be.

The source of payment of insurance claims is also the formed insurance fund. At the same time, current insurance activities are funded by acquisition costs. They undoubtedly affect insurance activities from developing a financial development potential, but their share in the overall cost structure is negligible. The results of insurance activity are significantly affected by reinsurance. Its significance as a risk diversification system cannot be overestimated. At the same time, the transfer of part of insurance reserves to reinsurance reduces not only insolvency under insurance contracts, but also income, and at the same time the financial potential of development (equation (1)).

The higher the share of insurance premiums transferred to reinsurance, the worse can be considered insurance activity. Under the notion of "worse", we mean less profitable. According to the above considerations, we propose the following definition of the index of insurance activity:

$$IB = \frac{IP - II - AC - REP}{Ocap + IR - (II + TC)} \quad (1)$$

Note: Developed by the authors for the insurance market based on the Franchon and Romanet (1985).

where *IB* (Insurance Business) - the result of insurance activity in the analysed period;

IP (Insurance Premiums) - gross insurance payments for the period under review; *II* (Insurance Indemnities) - insurance claims for the analysed period; *AC* (Acquisition Costs) - acquisition costs for the analysed period; *REP* (Reinsurance Premiums) - premiums ceded to reinsurers for the analysed period.

The results of financial activity will be considered a change in the volume of the guarantee fund and available insurance reserves.

The results of financial activity accumulate the results of the management of the insurance company concerning its financial resources. That is, those funds and financial assets that were formed as a result of insurance and investment activity, and constitute the financial provision of insurance liabilities. It should be noted that the insurance reserves are not the property of the insurer, but it has the right to manage them and use them as investment resources following the chosen development strategy.

To the guarantee fund, we include all capital surplus, additional reserves, and retained earnings. It should be noted that at the disposal of insurance companies there are financial resources for the insured to fulfil their insurance obligations, ensure the normal functioning of the activities of insurance organisations, as well as income from investment operations. Compensation of expenses, as well as profit from investment operations. This leads to the fact that the efforts of insurers are aimed not at the provision of insurance protection, but on the preservation of the largest possible size of the guarantee fund and its investment. Compensation is given to the subsidiary function and, accordingly, reduces the amount of insurance for damages.

As part of the study, the insurer's financial position is significantly influenced by the results of the investment activity of the insurance company and it can be stated that the profit or loss on the results of the fiscal year is a consequence and reflection of the correctness of the chosen investment policy. Partly, the income from investment activity, the insurance organisation can use to cover the negative financial result of insurance operations, which may be due to the increased loss making this year, and the growth of competition in the insurance market. In addition, the participation in investment activities gives the organisation responsible for life insurance, the ability to transfer part of the profits to the policyholder. One of the critical sources of equity growth is investment income, which in exceptional circumstances can be used to cover insurance obligations. In general, investment income serves as an insurance industry for a stable self-insurance fund.

The insurer's financial activity is considered as a targeted system of measures to implement current and strategic tasks of development, provision, and management of financial resources, as well as full compliance with financial obligations. The financial evaluation of the insurance industry's operations can be obtained using this means that the insurance:

$$FB = \frac{\Delta GF + \Delta IR}{Ocap + IR - (II + TC)} \quad (2)$$

Note: Developed by the authors for the insurance market based on the Franchon and Romanet (1985).

where *FB* (*Financial Business*) - the result of financial activity in the period analysed; *GF* (*Guarantee Fund*) - the result of a change in the volume of the guarantee fund for the period being analysed; *IR* (*Insurance Reserves*) - the result of changes in the volume of insurance reserves for the period analysed.

The resulting capital efficiency of the financial and economic activities of the insurer is the sum of financial and insurance results, where the direction of the financial business covers investment activities and asset management activities, and the insurance result is the difference between the received insurance payments, insurance indemnity payments, accrued expenses and premiums transferred to reinsurance for the period being analysed. These indicators are vital to finding the right direction for the balance (harmonic equilibrium) position together with the use of an integral indicator of development FDP (financial development potential), which in turn can be found by the following equation (3):

$$FDP = Ocap + IR - (II + TC) \quad (3)$$

Note: Developed by the authors for the insurance market based on the Franchon and Romanet (1985).

where *Ocap* (*Own Capital*) - equity; *IR* - Insurance Reserves; *II* - Insurance Indemnities (claims); *TC* - Total Costs.

Indicator of insurance activity is based on the following methodology:

$$IBFB = IB + FB \quad (4)$$

The analysis of *IB*, *FB*, and their amounts is necessary to ascertain the dynamics of cash flows as a result of insurance and investment activity. If by some indicator (*IB*, *FB*) we get a negative value, this will mean the occurrence of problems that need to be resolved immediately. The structured matrix helps to predict the "critical path" of the insurer for the future and to determine the indicator of the potential of financial development - to determine the number of financial resources that can be invested in development. The matrix of the financial strategy allows predicting the financial development of the insurer based on cash flow management and will have the following form (Figure 1):

Figure 1. Matrix of the financial strategy of the insurance industry

	FB << 0	FB = 0	FB >> 0
IB >> 0	1 IBFB = 0	4 IBFB > 0	6 IBFB >> 0
IB = 0	7 IBFB < 0	2 IBFB = 0	5 IBFB > 0
IB << 0	9 IBFB << 0	8 IBFB < 0	3 IBFB = 0

You can give such an interpretation of the given squares:

1. If *IB* is significantly less than zero, this situation may be caused by the following:

- the insurance payments for the analysed period exceed the net insurance payments. That is, the insurance industry has an unbalanced insurance portfolio, which is dominated by risks with a high level of loss rates;
- the insurance payments for the analysed period are on an equilibrium level compared to the fees; however, the insurers have a low level of own retention of the assignor, that is, the reinsurance transferred a significant proportion of the number of insurance premiums, which indicates the impossibility of the insurance company to comply insurance liabilities;
- the acquisition costs for the analysed period have increased dramatically and thus covered the results of the activity: that is, the insurance company has no justification for the number of acquisition costs;
- the insurance payments have a steady tendency to decrease, which indicates a deterioration in the insurance activity of the insurer;
- all factors act simultaneously; that is, managers of companies do not perform their functions in financial management.

2. *IB* is equal to 0. This may be due to the following circumstances:

- the insurance payments for the analysed period do not exceed the income of insurance payments but are at a significant level. This situation is also critical, as it indicates an imbalance in the insurance portfolio;
- the insurance payments for the analysed period are at a stable level, but the company transfers a significant part of the received insurance premiums to reinsurance, which indirectly indicates a decrease in the financial stability of the insurer;
- the insurance premiums are gradually decreasing, which indicates a deterioration of insurance activity;
- acquisition costs for the analysed period tend to increase, and this leads to a decrease in the effectiveness of insurance activities;
- all factors act simultaneously, that is, managers of companies do not perform their functions in financial management.

3. *IB* significantly exceeds 0. This can be caused by:

- insurance payments have a steady tendency to increase, which indicates the accumulation of a certain potential and the desire of companies for financial sustainability and expansion of activities;
- the insurance payments for the analysed period tend to decrease, indicating a well-balanced portfolio of insurance services, adequate tariff rates, and an effective insurance policy;
- the share of own retention of the assignor has a positive dynamics, which testifies to financial reliability, firm's stability, balanced insurance portfolio. At the same time, this confirms a certain aggressive policy in the insurance business;
- acquisition costs are almost unchanged, which allows accumulating financial potential and show good management organisation;
- all factors are operating simultaneously, that is, the company is at a decent level and seeks to

consolidate, and in the future - and expansion of insurance activity.

4. *FB* is much less than 0. This can be caused by:
- the change in the size of the guarantee fund has a negative value. That is, for the period analysed, the industry expenses significantly exceeded its revenues. The financial activity of the insurer for such a period was unprofitable due to lack of profit or loss from insurance activities, lack of profit or loss from investment activity, receipt of loss from participation in the capital, a sharp increase in financial expenses. This situation is evidence of ineffective financial management by the insurer, miscalculations in the directions of investment investments in one or another financial instrument or lack of an investment component in the insurer's financial resources management system;
 - the change in the size of the insurance reserves remaining in the management of the insurer has a negative value, that is, from the formed insurance reserves, we subtract the reserves transferred to reinsurance. This means that all the reserves created by the insurer are fully reinsured, resulting in it does not have investment resources that would provide him with income coverage, while

the costs of doing business, more precisely, their reduction, would be a certain source of financial stability and a source of financial capacity building development.

5. *FB* is equal to 0. This may be due to the following circumstances: all capital surplus, additional reserves, and retained earnings changes are equal to the changes in the insurance reserves. Thus, it showed the situation of the net profit and dividend policy capacity to cover the unearned premiums and loss reserves.

6. *FB* is more than 0. This can be caused by:
- the change in the size of the guarantee fund has a positive value, reasoned the excess of revenues to expenses. The financial activity of the insurer for such a period was profitable due to: profit from the insurance and/or investment activities. This situation is evidence of effective financial management by the insurer;
 - the change in the size of the insurance reserves remaining in the management of the insurer has a positive value, with the optimal reinsurance level.

The overall abstract of the nine matrix cells is presented in Table 1.

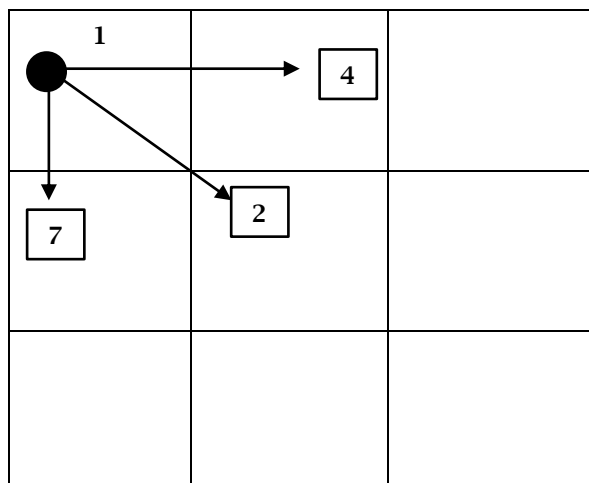
Table 1. Synthesis of the matrix evaluation of the insurer

Square	Description	Evaluation	Characteristics
1.	Maximum balance	$FB \ll 0$ $IB \gg 0$	Gap in financial opportunities; Effective insurance portfolio.
2.	Stable balance	$FB = 0$ $IB = 0$	Necessity of portfolio restructuring; sufficient investment results.
3.	Unbalanced position	$FB \gg 0$ $IB \ll 0$	Lack of financial resources; Well-established insurance activity.
4.	Rise in activity	$FB = 0$ $IB \ll 0$	Limited financial stability; Significant loss and expense ratio level.
5.	The limit of the stability	$FB \gg 0$ $IB = 0$	Well-balanced insurance portfolio; limited financial stability.
6.	Maximum financial development potential	$FB \gg 0$ $IB \gg 0$	Significant financial and insurance capital solidity.
7.	Lack of financial resources	$FB \ll 0$ $IB = 0$	Insufficient investment revenues and reinsurance.
8.	Pre-crisis condition	$FB = 0$ $IB \ll 0$	Necessity of equity increase and investment portfolio restructuring.
9.	Crisis condition	$FB \ll 0$ $IB \ll 0$	Lack of investment and insurance income.

Source: Created by the authors.

Based on the selected sample and accordingly, to *IBFB* calculations, the insurance industry can take Square 1, which characterises the state of equilibrium (Figure 2).

Figure 2. Position of the maximum balance

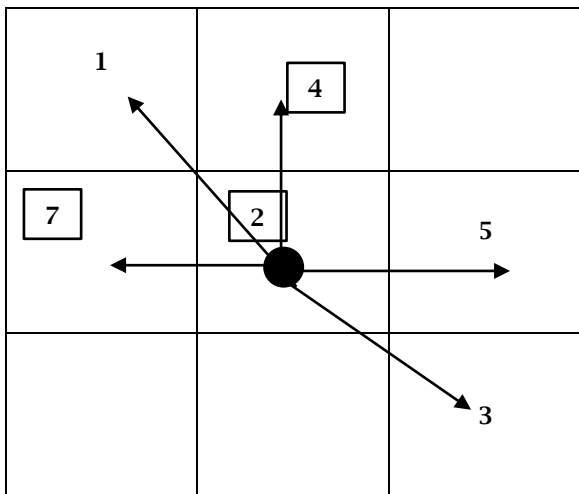


According to equation (1), this means that the active insurance activities are carried in the industry. As well it means the availability of the broad assortment in the portfolio of insurance services and significant insurance revenues, diversified due to this wide range. At the same time, based on equation (2), the managers of the insurance company do not pay attention to the management of financial resources, thereby reducing the competitiveness of the company, its financial stability, and financial potential. The insurer counts only on income from insurance activity, not using investment opportunities. With the growth of the volume of insurance indemnity (which today is a global trend that is observed in the insurance market) and the unchanging attitude to financial resources management, it is possible to move into Square 7.

When introducing mechanisms for managing investment resources, it is possible to switch to Square 4. In the case of actions of the factors of growth of insolvency and the introduction of mechanisms of management of investment resources, a transition to Square 2 is possible. Being in Square 2, the insurer has a state of so-called

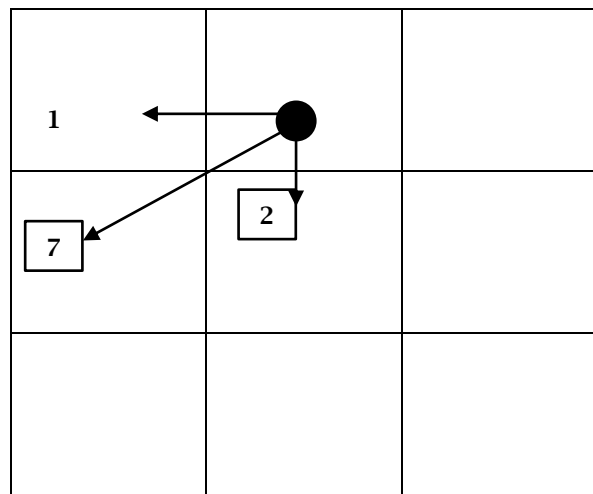
equilibrium, but if for other enterprises this situation is positive, then this cannot be said about the insurer: without receiving a positive income from insurance and investment activity, the insurer worsens its financial stability, relying only on the financial reserve, created in previous years, or the authorised fund. The insurer has the opportunity, when conducting an active investment policy, to move into Squares 5 or 3. At the same time, one should not underestimate the risk of growing competition in the insurance market, which may lead the insurance company to Square 8. Using the accumulated financial development potential will give a chance to get into Squares 1, 4, or 7 (Figure 3).

Figure 3. Stable balance



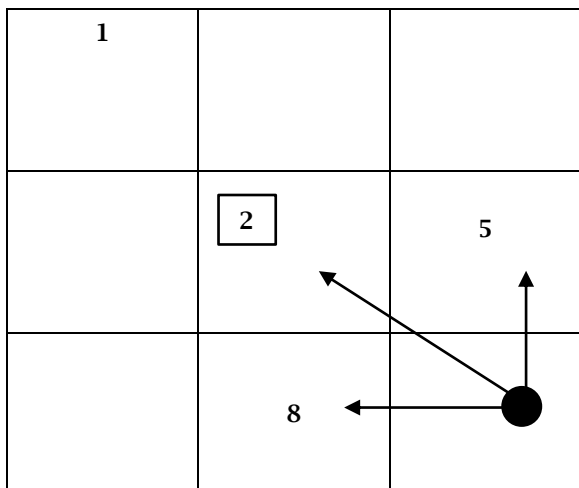
In Square 4, the insurer is on the rise. It is precisely this position, from our point of view, that is most attractive for the acquisition or sale of an insurance company when the insurance activity is well-established, but financial resources are not enough for expansion. Transition to Square 5 is possible with active and productive financial activity, when additional contributions, for example, the growth of additional capital, can increase the number of investment resources, and, accordingly, investment income. The transition to Square 1 is possible for the introduction of revenues for the development of the insurance business. At the same time, there is a risk of imbalance in the insurance portfolio and a move to Square 7 (Figure 5).

Figure 5. Rise in the activity



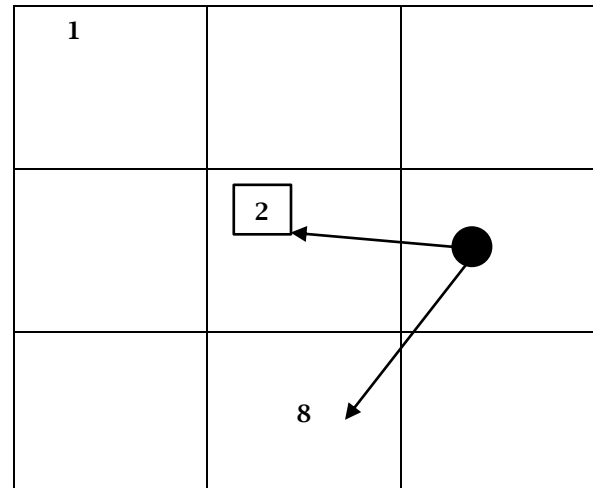
The presence in Square 3 indicates that the insurer has an unbalanced insurance portfolio, but the losses are offset by active investment activity; if no measures are taken to balance the portfolio, then the insurance company will fall into Square 8; when implementing development measures, it will be in Square 2. The transition to Square 5 is very problematic and possible for additional financial investments and simultaneous actions to balance the insurance portfolio. That is, we can assume that Squares 2 and 3 are those positions that require the use of financial development potential (Figure 4).

Figure 4. Unbalanced position



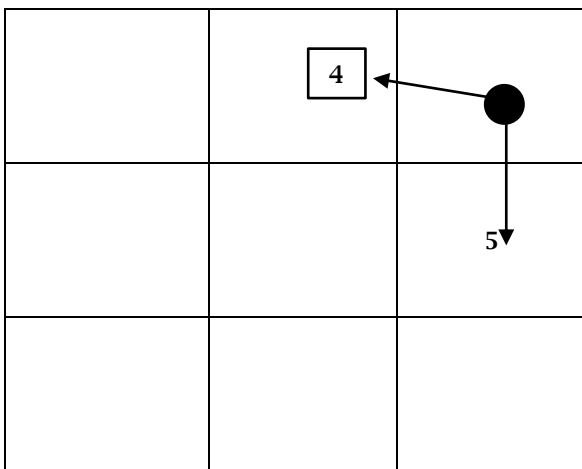
Being in Square 5, the insurer has a balanced insurance portfolio, but its level of stability is on the verge. Therefore, measures are required to expand the insurance business (for this, the insurance company has a financial development potential), but it should be remembered that the financial component may be temporarily reduced. In such a situation, an effective system of financial management of development is urgently needed. In the opposite case, the insurance company may find itself in Square 8 (Figure 6).

Figure 6. The limit of the stability



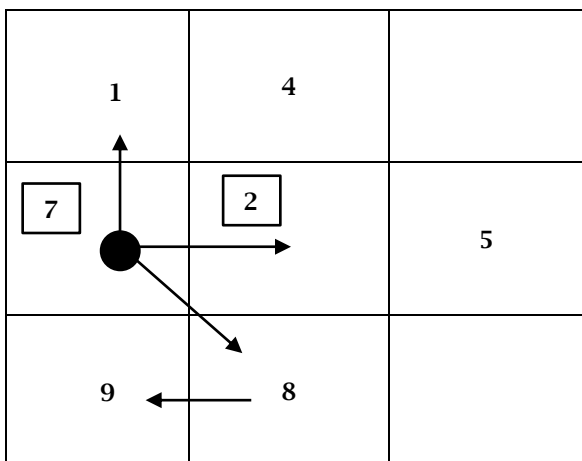
Based on the selected sample and accordingly, to *IBFB* calculations, the company may find itself in Square of 6, i.e., the rates of insurance and financial activities are at the highest level. The insurer has significant insurance and financial potential and strives to expand its activities through the creation of additional branches and units, the introduction of new products, and the absorption of other insurers. If the company decides to create additional subsidiaries, it may find itself in Square 5, as the likelihood of unbalancing the insurance portfolio increases significantly, which will worsen the results of insurance activity. In the case of an acquisition or entry as a founder in another insurance company, the insurer will significantly reduce its investment income by eliminating a significant amount of financial assets from circulation (Figure 7).

Figure 7. Maximum financial development potential



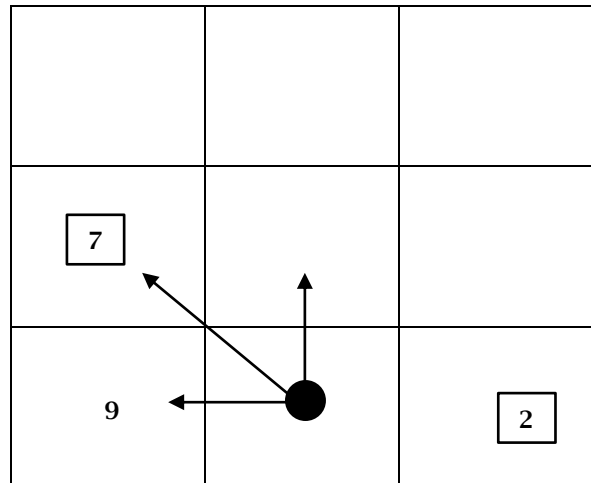
In Square 7, the insurer always feels insufficient financial resources to ensure financial stability. It can rely only on those circumstances that the level of loss making on accepted risks does not increase. Such a situation prompts the insurance company to transfer most of the formed insurance reserves to reinsurance, which reduces the insurer's investment resources, does not allow developing the financial potential, and plans for further development. With increasing competition, such an insurer may find himself in Square 1, and then in Square 9 (Figure 8).

Figure 8. Lack of financial resources



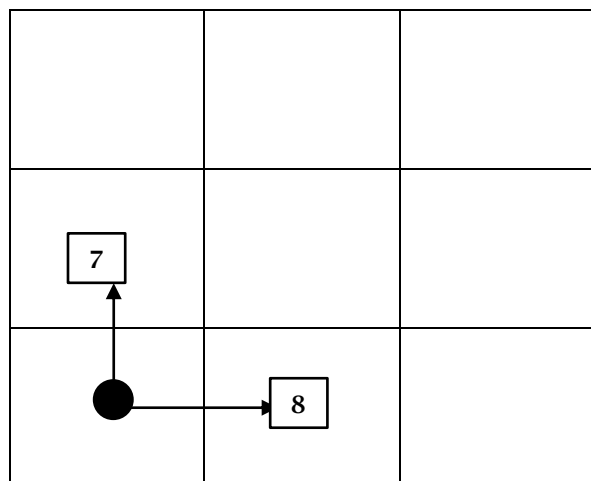
Square 8 characterises the pre-crisis state. Revenues are insufficient for the development and coverage of insurance losses. If measures are implemented to balance the insurance portfolio, implement a weighted policy of reinsurance and attract own additional resources, then a possible transition to Squares 7 and 2. In the other case, Square 9 (Figure 9).

Figure 9. Pre-crisis condition



The way out of such a situation is the attraction of additional financial resources in the direction of both increases in the equity and increase of efficiency of investment activity. This will allow moving into Squares 2 or 1. The position in Square 9 characterises the state of the insurer as a crisis. Insurance reserves are insufficient for the payment of insurance indemnity even in the presence of a reinsurance system. To cover losses, use the authorised capital and the guarantee fund (Figure 10).

Figure 10. Crisis condition



There are also significant problems in the investment area, either due to lack of investment resources and their income or with their loss making. In such a situation, the merger of two insurers with the preservation of the status of each, or the occurrence of an insurer to another insurance

company in the form of a structural unit is possible. A specific result can be obtained in the event of significant involvement of financial resources. It is also necessary to take measures to balance the insurance portfolio to minimise risks that have a higher loss making effect. The coordinate system of the matrix ultimately reflects the specified processes and is the aggregate value of assessments of the development of two critical aspects of activity: insurance and financial business (*IB* and *FB*).

4. DATA ANALYSIS AND EMPIRICAL FINDINGS

We source the secondary data for the analysis from the official web-sites of the OECD Country insurance database (n.d.), the Institute for the Supervision of Insurance (IVASS) and National Association of the insurance enterprises (ANIA) reports for Italy, namely the accounting-based information for the years 2013-2017. For observation, the selection

included non-life and life insurers sectors of each economy. Table 1 shows the breakdown of the sample by year. A descriptive research design was used. The total quantity of the insurance companies investigated is presented below in Table 2.

Table 2. A number of insurance companies of Italy for calculation of indicators *IB*, *FB*, and *FDP*

Indicator	2013	2014	2015	2016	2017
Italy	232	226	220	215	213

Source: Created by the authors. The table is based on data extracted from ANIA annual reports, 2013-2017 (ANIA, 2018).

We constructed the variables, such as *Insurance Business* (equation (1)), *Financial Business* (equation (2)), and *Financial Development Potential* (equation (4)) that are described in the Methodological section. For these variables' calculations, the data from Table 3 were used.

Table 3. Data of the insurance companies of Italy for calculation of indicators *IB*, *FB*, and *FDP* (2013-2017)

No.	Indicator	Italy, mln. EURO				
		2013	2014	2015	2016	2017
1.	Gross Insurance Premiums	117 374	142 035	146 005	132 954	129 302
2.	Insurance Claims	88 322	84 838	90 530	82 209	90 512
3.	Acquisition Costs	1 478	1 629	1 617	1 489	1 476
4.	Reinsurance Premiums paid	16 533	15 109	14 104	13 734	13 646
5.	Guarantee Funds	63 906	64 403	66 223	66 361	66 836
6.	Insurance Reserves	530 905	591 746	647 523	693 910	729 554
7.	Total Costs	11 725	12 126	12 382	12 213	12 356
8.	Equity	53 538	53 552	53 547	53 140	52 812

Source: Created by the authors. The table is based on data extracted from ANIA Statistical Appendix (ANIA, 2018) and OECD Insurance Database Balance Sheets, 2013-2017 (OECD, n.d.).

Analysis of *IB*, *FB*, and the sum is necessary for finding out the dynamics of cash flows as a result of insurance and investment activity. For financial performance, we will consider changes in the volume of the guarantee fund and available insurance reserves. If one of the obtained indicators (*IB*, *FB*) is

negative, this indicates the emergence of problems and threats to this activity, which need to be addressed immediately.

The calculations for the insurance industry in the Italian market are presented in Table 4.

Table 4. Calculation of *FDP*, *IB*, and *FB* (Italy, 2014-2017)

Indicator	2014	2015	2016	2017
<i>FDP</i> (Financial Development Potential)	548 334	598 158	652 628	679 498
<i>IB</i> (Insurance Business)	0.1	0.1	0.1	0.0
<i>FB</i> (Financial Business)	0.1	0.1	0.1	0.1

Source: Created by the authors. The table is based on data extracted from ANIA Statistical Appendix (ANIA, 2018) and OECD Insurance Database Balance Sheets, 2013-2017 (OECD, n.d.).

5. DISCUSSION OF THE RESULTS

For the financial performance of Italian insurers, we will consider changes in the volume of the investment income and available insurance reserves.

A well-modelled matrix will help to obtain and predict promising directions for the development of an insurance market, and the value of a financial state indicator will allow determining the number of financial resources that can subsequently be invested in the development of an organisation. According to the calculation from Table 4, the data of the matrix for the Italian insurance market are presented in Figure 11.

For three years, from 2014 to 2016, the *IBFB* indicator was always in the square of the maximum financial potential of the development of the insurance company. This indicates that the insurance and financial performance indicators were

at the highest level. Insurers had significant insurance and financial potential and sought to expand their activities through the creation of additional branches and divisions, the introduction of new products, and the absorption of other insurers.

In 2017, the *IBFB* indicator from the square of the maximum financial development potential of the insurance company moved to the square of the insurance company's stability as a result of the imbalance in the insurance portfolio, which led to the worsening of the results of insurance activity. If in 2016, the ratio of insurance payments to insurance payments was 62%, then in 2017 the ratio of these indicators increased to 70%. This was since the number of insurance payments decreased by 2.7% in 2017 compared to 2016, while the number of stadium payments in 2017 increased by 10.1% compared with 2016.

Figure 11. Matrix of financial strategy for the insurance market of Italy (2014-2017)

	$FB \ll 0$	$FB = 0$	$FB \gg 0$
$IB \gg 0$	1	4	6 <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2014</div> <div style="text-align: center; margin: 2px 0;">↓</div> <div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2015</div> <div style="text-align: center; margin: 2px 0;">↓</div> <div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2016</div> </div>
$IB = 0$	7	2	5 <div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2017</div> </div>
$IB \ll 0$	9	8	3

Being within the square of the limits of the insurance company's stability, measures are needed to expand the insurance business (for this the insurance company has a financial development potential), but it should be remembered that the financial component may be temporarily reduced. In such a situation, an effective system of financial management of development is urgently needed. In the opposite case, the insurance company may find itself in the square of the pre-crisis state of the insurer. Thus, for the case of Italy, the results confirm the hypotheses formulated. You may forecast the position of the insurance market, based on the volume of the financial development potential and by taking the concrete measures by the regulator to change the state of the insurance business and financial business of the overall market.

6. CONCLUSION

The paper has the attempt to validate the matrix forecasting method theorised by Franchon and Romanet (1985) and show if it may improve the decision-making for insurance market regulation, based on the insurer capital efficiency. The main research question concern with the ability of matrix forecasting to find out the future market position (*H1*) that is characterised by the financial development potential distributed through the structure of the capital funds available for insurance and financial activities (*H2*). In order to answer these questions, we assessed the capital solidity for insurance and investment activities of the Italian insurance market. The method offers estimates of the inefficient regulative steps, which should be prevented to bring the insurers to the worse financial positions. The analysed data for the 2013-2017 includes the representations of non-life and life insurers sectors for Italy.

The main results are the identification of the consequent change of the market position of the insurance market of Italy from "maximum development potential" to the cell of "the lack of stability". So, our two research hypotheses result both confirmed in the case of Italy. Results provide

empirical evidence on the reliability of the results of financial and insurance performance forecasting, in very different markets. The matrix approach reveals to be the right way of visualisation the past and future levels of insurance and investment activities interaction as well as their interdependence. This means the greater capital efficiency impose the higher insurance market potential.

Calculated capital efficiency allows finding out the attractiveness of the insurance business in a particular country from the portfolio perspective. Consolidated result of the investment and insurance activities allow harmonising both operations from a management perspective.

The paper contributes mainly to the evaluating of the insurers' strategy by definition the capital availability to cover future investment and insurance activity. In this sense, the matrix forecasting could be considered a useful tool for the government to re-examine its policy and strategy for future development. The regulator can evaluate financial performance, fix the determinants, and predict their future trends. As well the matrix may serve as the initial evaluation that allows detecting financial problems and the reasons. Each matrix cell was supported by the subjective interpretation and careful explanation of current position judgements and future strategic decisions. The tool description is a supportive rationale to improved policy-makers decisions.

Differently from previous studies conducted on the performance of the insurance companies, this paper concerns with the integrated results of the insurance and asset management activities. This is an element of great originality that provide an innovative perspective to investigate the insurance industry. Consolidated result of the investment and insurance activities allow harmonising both operations from management and administrative perspective.

However, there are several limitations to this study that may be addressed in future research.

At the moment, the core limits are concerned with the small use of the matrix methods for performance measurement of the financial strategy, precisely for the insurance market.

The application of the matrix tools is concerned with major with risk management matrices or rating transition matrices. Even though this circumstance gives originality to our paper, however, it poses a problem of data collection and limits the possibility to conduct the comparison with other scientific results.

Possible extensions of our research are the following. Firstly, the matrix tool should be applied

to many countries different from that analysed in our paper in order to further test this method. Secondly, it could be exciting to conduct the same analysis separately for life insurance and non-life insurance to identify any differences. Thirdly, test whether the matrix tool could be used at a single company level to help managers in formulating the future strategies to be implemented.

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