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International Conference on Law

University for Business and Technology - UBT

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International Conference on Law

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International Conference is the 12th international interdisciplinary peer reviewed conference which publishes works of the scientists as well as practitioners in the area where UBT is active in Education, Research and Development. The UBT aims to implement an integrated strategy to establish itself as an internationally competitive, research-intensive institution, committed to the transfer of knowledge and the provision of a world-class education to the most talented students from all backgrounds. It is delivering different courses in science, management and technology. This year we celebrate the 21th Years Anniversary. The main perspective of the conference is to connect scientists and practitioners from different disciplines in the same place and make them be aware of the recent advancements in different research fields, and provide them with a unique forum to share their experiences. It is also the place to support the new academic staff for doing research and publish their work in international standard level. This conference consists of sub conferences in different fields: - Management, Business and Economics - Humanities and Social Sciences (Law, Political Sciences, Media and Communications) - Computer Science and Information Systems - Mechatronics, Robotics, Energy and Systems Engineering - Architecture, Integrated Design, Spatial Planning, Civil Engineering and Infrastructure - Life Sciences and Technologies (Medicine, Nursing, Pharmaceutical Sciences, Phycology, Dentistry, and Food Science),- Art Disciplines (Integrated Design, Music, Fashion, and Art). This conference is the major scientific event of the UBT. It is organizing annually and always in cooperation with the partner universities from the region and Europe. In this case as partner universities are: University of Tirana – Faculty of Economics, University of Korca. As professional partners in this conference are: Kosova Association for Control, Automation and Systems Engineering (KA – CASE), Kosova Association for Modeling and Simulation (KA – SIM), Quality Kosova, Kosova Association for Management. This conference is sponsored by EUROSIM - The European Association of Simulation. We have to thank all Authors, partners, sponsors and also the conference organizing team making this event a real international scientific event. This year we have more application, participants and publication than last year.

Congratulation!

Edmond

Hajrizi, Rector of UBT and Chair of IC – BTI 202

Content

Enhancing Real Estate Management: The Transformative Role of Machine Learning in Predictive Gains and Risk Model Performance

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Abstract: Mortgage scoring models are pivotal in evaluating the risk associated with mortgages. Traditionally, these models were constructed using logistic regression. However, with the rise of machine learning, algorithms such as classification trees and neural networks have been employed. These algorithms are trained on a sample of mortgages, with the occurrence or non-occurrence of default observed. The data is then split into training and test samples, with machine learning algorithms further dividing the training sample for validation. This approach aims to determine hyperparameters that maximize performance while minimizing overfitting. Once calibrated, the model is applied to the test sample to predict default events. Despite the sophistication of machine learning algorithms, their predictive performance in mortgage scoring is comparable to logistic regression. Ensemble methods, which combine multiple models, have shown potential in enhancing predictive performance. This literature review explores the application of machine learning in mortgage scoring, comparing it with traditional methods, and discussing its implications.

Keywords: scoring model, mortgage default, machine learning algorithms, logistic regression, receiver operating characteristic curve, neural networks

Introduction

The rapid evolution of machine learning and its application in various sectors has garnered significant attention in the academic and industrial world. One such application is in the realm of real estate mortgage scoring. Traditional scoring models, primarily based on logistic regression, have been the cornerstone for evaluating the risk associated with mortgages. However, with the advent of machine learning algorithms, there's a paradigm shift in how these evaluations are conducted. This literature review aims to delve into the nuances of machine learning algorithms in mortgage scoring, comparing their efficacy with traditional models, and understanding the intricacies of their predictive performance.

Literature review

Any scoring model is constructed from a sample of n mortgages for which the occurrence or non-occurrence of default is observed, represented by a dichotomous variable Y. For each individual in this sample, we also have a set of explanatory or predictor variables, which correspond, for example, to information on the nature of the contract and the borrower. This database is then broken down into two sub-samples: a training sample on which the model is selected, calibrated, and possibly estimated, and a test sample on which the out-of-sample predictive performance is evaluated (Foryś, 2022) 1. For machine learning algorithms, the training sample is usually decomposed into two sub-samples: a sample on which the

[1]Foryś, 2022

classification algorithm is trained and a validation sample that makes it possible to determine the value of the hyperparameters (or tuning parameters) associated with the classification method and thus to control the phenomenon of over-learning.

8 The idea is then to determine the value of the hyperparameters, which maximizes a performance measure calculated on a sample (the validation sample) different from that on which the algorithm is trained (the learning sample). Thus, this approach reduces the risk of overfitting induced by setting "optimal" values for the hyperparameters (Choy & Ho, 2023) 2. This would allow the classification to be reproduced almost perfectly on the training sample but would ultimately lead to poor performance of out-of-sample classification. This approach can be generalized to a k-fold cross-validation approach applied to the entire learning sample.

Once the model has been calibrated (for machine learning algorithms) or estimated (for the usual parametric approaches), it is applied to the test sample. Depending on the models, we then obtain for each individual in the test sample either an estimate of the conditional probability of occurrence of the default event, as, for example, in the case of a logistic regression, or directly a forecast of this event represented in the form of a dichotomous variable $\hat{Y}$, as, for example, in the case of a classification tree. When the models produce estimated probabilities, we are reduced to a forecast on the event $\hat{Y}$ by comparing the probability to a threshold c, typically 50% (Foryś, 2022)3. If the probability exceeds this threshold, we predict the event's occurrence, i.e., $\hat{Y}(c) = 1$. For a given threshold, we can construct a confusion matrix listing the occurrences of two classification errors made on the test sample. False positives correspond to individuals for whom the model had predicted a defect ($\hat{Y}(c) = 1$) but for whom no defect was observed ex-post ($Y = 0$).

Conversely, false negatives correspond to individuals for whom the model had not predicted a defect and for whom a defect was observed. These errors can be expressed as ratios, such as specificity and sensitivity. The sensitivity corresponds to the probability of predicting the defect in the population of defects. At the same time, the specificity is the probability of predicting a non-defect in the population of non-defects. From these elements, we can then construct the Receiver Operating Characteristic (ROC) curve, the elements of which correspond to the sensitivity (ordinate axis) and the specificity (abscissa axis) obtained for threshold values c varying from 0 to 1 (see graph below). The interest of the ROC curve is to allow the predictive capacity of the classification model to be assessed independently of the choice of the threshold.

From the mid-1980s, many academic studies sought to assess the predictive performance gains of machine learning methods compared to logistic regression. Thirty years later, the diagnosis is relatively mixed. Makowski (1985) 4, Coffman (1986) 5, Srinivasan and Kim (1987) 6, and Carter and Catlett (1987) 7 were among the first to apply classification trees for real estate mortgage scoring to capture the interactions between predictors (Foryś, 2022) 8. Artificial neural networks were also very quickly applied, mainly to problems of scoring banking establishments (Tam and Kiang, 1992) 9 or companies.

This last study concludes in a mixed way by pointing in particular to the black box aspect of neural networks, the sometimes-illogical weight given to certain predictors, and the overfitting

[2]Choy & Ho, 2023
[3]Foryś, 2022
[4]Makowski, 1985
[5]Coffman, 1986
[6]Srinivasan and Kim, 1987
[7]Carter and Catlett, 1987
[8]Foryś, 2022
[9]Tam and Kiang, 1992

problems. Isada (2022) 10 compares different kinds of neural networks to standard techniques, such as logistic regression and linear discriminant analysis, on a personal real estate mortgage basis. They show that neural networks offer good predictive performance when looking at the percentage of correctly classified bad real estate mortgages. On the other hand, the predictive performance of neural networks is similar to that of logistic regression concerning the percentage of good and bad real estate mortgages correctly identified.

In general, individual machine learning classifiers do not significantly improve the predictive performance of logistic regression. These results are confirmed by Isada (2022) 11, who proposes the first literature synthesis concerning scoring models, including machine learning techniques. The author reports the Percentage of Correct Classification (PCC) of six methods (classification trees, neural networks, logistic regression, linear regression, etc.) from five studies. It shows that no method dominates the others, but the differences between the PCCs of these different methods are very small.

These results are confirmed by the comparative study by Baesens et al.(2003) 12, which offers a systematic analysis of seventeen classification algorithms from eight mortgage databases provided by international banks. Support Vector Machines (SVM) or neural networks offer very good predictive performance for most of the databases considered, with Area under the Curve (AUC) ranging from 66% to 91% (Koktashev et al., 2019) 13. But the authors also show that the differences between the AUC of the best machine learning method and that of the logistic regression are less than 2% for most bases.

How can we explain such low-contrast predictive performance? The main advantage of these machine learning algorithms over standard parametric approaches lies in their ability to automatically reveal interactions between predictors and nonlinearities (threshold effects). Consider the example of a classification tree such as the one shown in the diagram above. Classifying a real estate mortgage as bad or good risk takes the form of a tree that splits into two at each node. The value of a predictor (for example, residential status) determines whether the right branch (non-owner) or the left branch (owner) should be considered for the rest of the algorithm. At the end of the algorithm, when the last node is reached, the real estate mortgage is assigned to a leaf and a forecast (0 or 1) (Koktashev et al., 2019) 14. This forecast corresponds to the majority class (0 or 1) of the observations belonging to this node. For example, imagine that out of the 1,000 mortgages in the initial sample, 120 mortgages were granted to customers as follows:

(1) owners

(2) customers with more than two years of seniority in the bank, and

(3) customers without children.

If among those 120 real estate mortgages assigned to the left leaf of the tree, the default frequency is low, for example, 14%, then the absence of default is predicted for all the real estate mortgages having these characteristics. Ultimately, everything happens as if we were considering a regression model in which binary explanatory variables defined by-products (or interactions) of the initial predictors would be introduced (Koktashev et al., 2019) 15. For example, the schema tree above ultimately amounts to constructing a first explanatory variable equal to 1 if the customer is the owner, has more than two years of seniority in his bank, and has

[10]Isada, 2022
[11]Ibid
[12]Baesens et al., 2003
[13]Koktashev et al., 2019
[14]Ibid
[15]Ibid

no children. Thus, the classification trees make it possible to capture interactions between the initial predictors and nonlinear effects, typically threshold effects in this case, which would have been difficult to identify in a standard parametric approach without evaluating an infinitely large number of combinations and thresholds. In general, we find a similar idea in many machine learning algorithms (neural networks, support vector machines, etc.) through transforming the data representation space.

The question is then to know if the modeled event presents this type of non-linearity is that real estate mortgage scoring is a field of application in which there are ultimately too few non-linearities in the usual data for the predictive performance gains of machine learning to be significant (Milunovich, 2019) 16.

Ultimately, the use of the first ensemble methods in the 2000s made it possible to obtain significant predictive gains. The intuition of these approaches is to combine different elementary classification models likely to provide additional information. We thus find the idea of an automatic combination of forecasts or models. Twelve years after the study by Baesens et al. (2003) 17, Lessman et al. (2015) 18 propose a new comparative analysis using other evaluation criteria (Brier score, H-measure, etc.) and the most recent machine learning algorithms, including ensemble methods based on the principle of bagging or boosting. In the end, their study focuses on 41 classification algorithms applied to 8 databases of real estate mortgages to individuals. Their conclusion favors machine learning is more than machine learning: several ensemble methods predict risk significantly better than logistic regression. For example, random forests systematically dominate individual classifiers, whether the latter are parametric (logistic regression) or of machine learning type [trees, neural networks, Support Vector Machines (SVM), etc.]. The best performance is obtained for heterogeneous ensemble methods like the Weighted Average Ensemble method. The second lesson of this study is that the gains in predictive performance linked to machine learning tend to level off. Methodological refinements of machine learning algorithms do not necessarily improve the performance of scoring models. For example, the Area Under Curves (AUCs) of rotation forests do not differ significantly from those of random forests.

The central question remains why do some machine learning algorithms exhibit good predictive performance? The answer is not obvious, and no rule seems to emerge. To date, no research has been able to explain the performance of these classifiers according to their characteristics and the characteristics of the databases.

Any scoring model is constructed from a sample of n mortgages for which the occurrence or non-occurrence of default is observed, represented by a dichotomous variable Y. For each individual in this sample, we also have a set of explanatory or predictor variables, which correspond, for example, to information on the nature of the contract and the borrower. This database is then broken down into two sub-samples: a training sample on which the model is selected, calibrated, and possibly estimated, and a test sample on which the out-of-sample predictive performance is evaluated (Foryś, 2022) 19. For machine learning algorithms, the training sample is usually decomposed into two sub-samples: a sample on which the classification algorithm is trained and a validation sample that makes it possible to determine the value of the hyperparameters (or tuning parameters) associated with the classification method and thus to control the phenomenon of over-learning.

The idea is then to determine the value of the hyperparameters, which maximizes a performance

[16]Milunovich, 2019
[17]Baesens et al., 2003
[18]Lessman et al., 2015
[19]Foryś, 2022

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[20]Choy & Ho, 2023
[21]Foryś, 2022
[22]Makowski, 1985
[23]Coffman, 1986
[24]Srinivasan and Kim, 1987
[25]Carter and Catlett, 1987
[26]Foryś, 2022
[27]Tam and Kiang, 1992
[28]Isada, 2022

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[29]Ibid
[30]Baesens et al., 2003
[31]Koktashev et al., 2019
[32]Ibid
[33]Ibid

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The central question remains why do some machine learning algorithms exhibit good predictive performance? The answer is not obvious, and no rule seems to emerge. To date, no research has been able to explain the performance of these classifiers according to their characteristics and the characteristics of the databases.

Discussion

Machine learning algorithms, especially classification trees, neural networks, and support vector machines, have been lauded for their ability to automatically reveal interactions between predictors and capture nonlinearities. For instance, classification trees can intuitively segment data based on certain criteria, such as residential status or bank seniority, and make predictions based on these segments. Such an approach can capture interactions and threshold effects that might be overlooked in traditional parametric models.

However, the predictive performance of individual machine learning classifiers, when compared to logistic regression, doesn't show a significant improvement. Studies by Isada (2022) and Baesens et al. (2003) confirm this observation, with differences in predictive performance being marginal at best. The primary advantage of machine learning algorithms lies in their ability to detect interactions between predictors and nonlinearities, which might not be prevalent in real estate mortgage scoring data. This could explain the low-contrast predictive performance observed.

Interestingly, ensemble methods introduced in the 2000s have shown promise in enhancing predictive performance. By combining different elementary classification models, these methods aim to harness the collective power of multiple models, potentially offering more accurate and robust predictions.

Conclusion

While machine learning algorithms offer sophisticated tools for data analysis and prediction, their application in real estate mortgage scoring has shown mixed results. Individual classifiers, though adept at capturing nonlinearities and interactions, do not significantly outperform

[34]Milunovich, 2019
[35]Baesens et al., 2003
[36]Lessman et al., 2015

traditional logistic regression models in predictive performance. However, ensemble methods present a promising avenue for future research and application. As the field of machine learning continues to evolve, it's imperative to continually assess and adapt these algorithms to specific domains, ensuring that they provide tangible benefits over traditional methods.

14 References:

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Environmental law and the legal framework for integrating impacts on indoor air quality in life cycle assessments

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Abstract. Products used during construction and operation of a building can contribute to Indoor Air Quality (IAQ) problems that affect occupants' well-being. However, IAQ is conventionally not addressed in the life cycle assessments (LCAs) of buildings and building related products even though IAQ leads to one of the areas of protection under LCA - human health impacts. In this study, we proposed an overall framework for integrating IAQ into LCA using the standard steps of LCA. The framework focused on IAQ and LCA modeling from two categories of building related products:

1) passive products that realize their function through initial installation and have long-term decayed emissions, and

2) active equipment that realize their function and cause emissions through daily operation. Dynamic and static life cycle inventory modeling approaches were proposed for passive products and active equipment, respectively. We concluded that it was feasible to integrate IAQ into building related LCA studies. Development of IAQ related impact assessment methodologies can improve upon the limitations of this study. Further studies need to be carried out to compare the health. This study demonstrates the appropriateness and significance of integrating indoor environments into LCA, which ensures a more holistic account of all exposure environments and allows for a better accountability of health impacts. Reducing chemical pressure on human and environmental health is an integral part of the global sustainability agenda.

Keywords: Indoor air quality, LCA, the legal framework of air quality.

Introduction

This document is one of a series of International Standards intended for use in the design of buildings and heating, ventilation and air conditioning systems. This series of International Standards specifies the methods of deriving design criteria for new buildings and systems and the retrofit of existing buildings for acceptable indoor environment. The indoor environment includes thermal, acoustic and lighting conditions, and indoor air quality (IAQ).

This International Standard covers methods of expressing IAQ and incorporating the goal of achieving good IAQ into the design process.

This International Standard recognizes that local laws, directives and regulations always apply and this document allows a compliance path which is consistent with such requirements.

The framework is established by the general principle documents.

This document does not prescribe a specific method but rather refers to existing methods in published standards and guidance, as referenced in this document. The referenced methods can be used to specify ventilation rates and other design requirements. The methods have in common the fact that they are based on a consideration of human health and/or comfort requirements. Therefore, the aim of the methods is to control indoor air pollutants to concentration levels below which, under the prevailing hygro-thermal conditions, the pollutants do not have the potential to :

— cause a significant risk of adverse health effects,

— adversely affect the comfort of the majority of occupants.

The pollutants considered include human bioeffluents, which have often been the principal consideration for IAQ and ventilation, but also all groups and sources of pollutants that can reasonably be anticipated to occur in the building being designed. The pollutants to be considered can, depending on the sources present, include

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volatile organic compounds (VOCs) and other organics, such as formaldehyde,

environmental tobacco smoke (ETS),

radon,

other inorganic gases, such as ozone, carbon monoxide and oxides of nitrogen,

viable particles, including viruses, bacteria and fungal spores,

non-viable biological pollutants, such as particles of mites or fungi and their metabolic products,

non-viable particles, such as dusts and fibers.

2 Scope

This International Standard is intended: to specify methods to express the quality of indoor air suitable for human occupancy, to allow several acceptable target levels of IAQ, depending on local requirements, constraints and expectations.

This International Standard applies to

the design of new buildings and their systems and the retrofit of existing buildings and systems,

indoor environments where the major concern is that of human occupants,

buildings having any combination of mechanical and natural ventilation,

commercial and institutional buildings.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.ISO 16813, Building environment design ;Indoor environment; General principles.

The law on the improvement of indoor air quality in closed places accessible to the public comes into force on 11 December 2022.This law constitutes a framework that must be supplemented by royal decrees. It does not therefore create direct obligations for the sectors affected by its application. These obligations and their implementation schedule will be specified in the coming months. The law establishes two reference level, indicative of indoor air quality, which are targets that each operator should aim to achieve when making investments to improve indoor air quality.

Reference level A:

- the concentration of CO2 in a room is less than 900 ppm (which means that CO2 represents 0.09% of the volume of the air considered), or

-t he minimum ventilation and air purification flow rate is 40 m3 per hour per person, including at least 25 m3 per hour per person of ventilation with outside air.

Reference level B:

- the concentration of CO2 in a room is less than 1,200 ppm (which means that CO2 represents 0.12% of the volume of the air considered), orthe minimum ventilation flow rate with outside air is 25 m3 per hour per person.

4 Methods

We first review potential human health impacts associated with the substances in building materials and the methods used to mitigate these impacts, also identifying several of the most important online data resources. A brief overview of the necessary steps for characterizing use stage chemical exposures and health impacts for building materials is then provided. Finally, we propose a systematic approach to integrate the use stage exposures and health impacts into building material LCA and describe its components, and then present a case study illustrating the application of the proposed approach to two representative chemicals: formaldehyde and methylene diphenyl diisocyanate (MDI) in particleboard products. Our proposed approach builds on the coupled near-field and far-field framework proposed by Environ Int 94:508–518, 2016, which is based on the product intake fraction (PiF) metric , The proposed approach consists of three major components: characterization of product usage and chemical content, human exposures, and toxicity, for which available methods and data sources are reviewed and research gaps are identified. The case study illustrates the difference in dominant exposure pathways between formaldehyde and MDI and also highlights the impact of timing and use duration (e.g., the initial 50 days of the use stage vs. the remaining 15 years) on the exposures and health impacts for the building occupants.

Conclusions

When approaching IAQ problems, efforts should be oriented on finding solutions that take into account several parameters and can therefore be useful to solve or avoid multiple issues. Attention should be given to the importance of reducing contaminants at the source (including the choice of non-emissive materials, increasing air tightness, and insulation), improving ventilation and, when relevant, purifying or treating the indoor environment. The integrated IAQ management approach that is presented here should be considered by decision makers, managers, public health players, and occupants that are wishing to maintain good IAQ in the context of climate change. The proposed approach thus provides the methodological basis for integrating into LCA the human health impacts associated with chemical exposures during the use stage of building materials. Data and modeling gaps which currently prohibit the application of the proposed systematic approach are discussed, including the need for chemical composition data, exposure models, and toxicity data. Research areas that are not currently focused on are also discussed, such as worker exposures and complex materials. Finally, future directions for integrating the use stage impacts of building materials into decision making in a tiered approach are discussed.

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Imposition of alternative measures in North Macedonia and comparison of probation in France and Croatia

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Abstract. When the criminal offense is mentioned, the only association is the prison sentence, as a justification that the purpose of the punishment is achieved with it. But today, modern criminal law legislation is characterized by humanity and the request for the imposition of non-institutional sanctions, in the sense that it is not always possible to expect that the desired results will be achieved with the prison sentence, which is the fight against criminality, its prevention and suppression. Fierce criticism of the short-term prison sentence and the prison sentence for its emphasized retributive character led to the emergence of new sanctions known as alternative measures, the main purpose of which is to suppress and prevent criminality, enabling the reintegration and resocialization of perpetrators of minor crimes. Although about 18 years have passed since the beginning of the application of the provisions on alternative measures in the Republic of North Macedonia, from the analysis of the statistical data, it can be noted that of the total imposed alternative measures, the conditional sentence is at the top of the list of imposed alternative measures. The purpose of this paper is, through statistical data analysis and visualizations, to determine the rate of imposed alternative measures in the Republic of North Macedonia and of imposed probation in EU member states such as France and Croatia, to compare the imposed measures in these countries, in terms of which measures are stricter in which countries, whether new measures should be foreseen and whether probation has an impact on the reduction of criminality.

Keywords: probation, alternative measures, prison sentence

General exposition of alternative measures

Alternative measures and its aim

When the criminal offense is mentioned, the only association is the prison sentence, as a justification that the purpose of the punishment is achieved with it. But today, modern criminal law legislation is characterized by humanity and the request for the imposition of non-institutional sanctions, in the sense that it is not always possible to expect that the desired results will be achieved with the prison sentence, which is the fight against criminality, its prevention and suppression.

Fierce criticism of the short-term prison sentence and the prison sentence for its emphasized retributive character led to the emergence of new sanctions known as alternative measures, the main purpose of which is to suppress and prevent criminality, enabling the reintegration and resocialization of perpetrators of minor crimes.

In the modern penal legal system, the prevailing opinion is that there are situations when the application of the prison sentence, which consists of deprivation of liberty, is not proven to be appropriate in a large number of cases, therefore, as an appropriate mechanism for resolving these situations, there are measures with which the purpose of the punishment it is achieved with milder treatment and it is achieved in freedom. It is also a way out of the problem with which the current situation in prison institutions collides and that is their overload and the idea that prison is an expensive sanction for society.37

The amendments of the criminal legislation and the alternative measures also have a wider social interest, because their pronouncement and application achieve other goals, which are of an economic and educational nature. Concretely said, with the application of these alternative measures, the prison faculties are released, on the one hand, and on the other hand, to the professionals in the penitentiary faculties are given a greater opportunity to re-educate the convicts.

The fight against criminality is complex and requires a high dedication to criminal law policy for its prevention and suppression. The high development of criminality and the resulting criticism of the prison sentence, as a central punishment and response to the turmoil of this social harm, indicates the need for other, additional means that enrich the system of measures and sanctions whose common and basic goal is the prevention of criminality.

The theory accent that the birth of the idea of alternative measures begins with the introduction of the prison sentence, which managed to win a dominant place in the legislation and grow into the strictest, but also the most frequently imposed sentence. It is primarily a normative category whose priority is to define the goals of the fight against crime. From the very beginning of the introduction of the prison sentence in the system of criminal sanctions (at the end of the 18th century), a process of finding its substitution with other, non-prison, alternative sanctions began. The process of finding alternatives to prison especially intensified in the second half of the last century and coincided with open skepticism towards prison and imprisonment, as well as fierce criticism towards resocialization, as one of the most important pillars on which criminal law and criminal policy rests after the Second World War.

In the Republic of North Macedonia, the alternative measures find their roots in the suspended sentence established in the Criminal Code of the SFRY OF 1951 and later amendments. [1]

The purpose of this paper is to determine, through statistical data, the practice of applying alternative measures in the Republic of North Macedonia and comparing the pronouncement of alternative measures in the Republic of Croatia and France.

1.2 Total sentences and alternative measures imposed in the Republic of North Macedonia from 2020 to 2022 in percentage

Table 1. Total convicted people, total sentences and total alternative measures by number 38

YEAR	Total convicted peoples	Sentences - total	Alternative measures - total
2020	6351	1372	2927
2021	7634	4287	3323
2022	7769	4360	3383
All years	21754	12063	9633

Table 2. Total convicted people, total sentences and total alternative measures by percentage

YEAR	Total convicted	Sentences – total %	Alternative measures

[37] Mustafai A. (2014) The pronouncement of the suspended sentence in the emphasis of basic court of Struga, Master thesis defended in “University Ss. Cyril and Methodius”, Faculty of Law" Iustinianus Primus" in Skopje

[38] State Statistical Office (2020, 2021, 2022) Reported, accused and convicted perpetrators of criminal offences (adults and children), Statistical reviews, Skopje

	peoples %		– total %
2020	100	53.79	46.09
2021	100	56.16	43.53
2022	100	56.12	43.54
All years	100	55.45%	44.28%

As shown in the above table, alternative measures have a significant place in the practice of the courts in the Republic of North Macedonia. For the period from 2020 to 2023, a total of 9,633 alternative measures were imposed, which is a percentage of 44.28% of the total of 21,754 convicted adults, of which a total of 12,063 sentences were imposed, which is a percentage of 55.45%.

Alternative measures were pronounced more in 2020 with 46.09%, in 2022 with 43.54%, less in 2021 with 43.53%.

Total registered, accused and convicted people in the Republic of Croatia from 2020 to 2022 in percentage

Table 3. Total number of convicted peoples and number of conditional sentences, partially conditional sentence and community work by number

YEAR	Total number of convicted peoples	Total number of inmates	Conditional sentence Partially conditional sentence Community work
2020	13615	1935	10494
2021	14471	2047	11128
2022	12355	2096	11260
All years	40411	6078	32822

Table 4. Total number of convicted and inmates' peoples and conditional sentence, partially conditional sentence and community work in percentage

YEAR	Convicted peoples %	Inmates - %	Conditional sentence Partially conditional sentence Community work
2020	100	14.21%	77.07
2021	100	14.14%	76.89
2022	100	16.96%	91.13
All years	100	15.04%	81.22%

Alternative measures also take a significant place in the practice of courts in the Republic of Croatia. For the period from 2020 to 2023, a total of 32,822 alternative measures were pronounced, which is a percentage of 81.22% of the total of 40,411 convicted adults, of which a total of 6,078 prison sentences were pronounced, which is a percentage of 15.04%.

Alternative measures in relation to the prison sentence were more pronounced in 2022 with 91.13%, in 2020 with 77.07%, less in 2021 with 76.89%.

Total accused peoples in France from 2020 to 2022 in percentage

Table 5. Total number of inmates and probationers by number39

YEAR	Total number of inmates	Total number of probationers	Total prison sentence and probation	
2020	82923	169667	252590	21
2021	75021	166044	241065	
2022	83267	180974	264241	
All years	241211	516685	757896	

Table 6. Total number of inmates and probationers by percentage

YEAR	Total inmates %	Total probationers %
2020	32.82%	67.17%
2021	31.12%	68.87%
2022	31.51%	68.48%
All years	31.88%	68.17%

Probation also has a significant place in the practice of courts in France. Comparing them with the number of imprisoned peoples from the above, we conclude that in France, alternative measures are pronounced massively, that is, twice as much. For the period from 2020 to 2023, a total of 241,211 were closed, which is a percentage of 31.88% of people, while 516,685 alternative measures were imposed per person, which is a percentage of 68.17%.

Alternative measures in relation to imprisoned peoples were pronounced more in 2021 with 68.87%, in 2022 with 68.48%, less in 2020 with 67.17%.

1.5 Volume and structure of alternative measures – probation in the Republic of North Macedonia, Republic of Croatia and France

Table 7. Total number of inmates and probationers by percentage

Countries	Year	Alternative measures - probation by number	Alternative measures Probation - Total %
Republic of North Macedonia	2020-2022	67.17%	44.28%
Republic of Croatia	2020-2022	68.87%	81.22%
France	2020-2022	68.48%	68.17%

From the given tables, we can conclude that the Republic of North Macedonia is becoming a "more rigorous" country because alternative measures compared to other punishments are imposed less, while alternative measures in the Republic of Croatia and France are imposed more compared to prison sentences. Percentage wise, for the period from 2020 to 2022, the Republic of North Macedonia has pronounced 44.28% alternative measures while 55.45% fines. What does the Republic of North Macedonia mean: 11.17% have pronounced fines rather than alternative measures. This is not the case of the Republic of Croatia, which for the period from 2020 to 2022 has pronounced 81.22% alternative measures of 15.04% imprisonment, which means alternative measures have been imposed 66.18% more. While in France, the imposition of alternative measures amounts to 68.17% of 21.88% prison sentences, which means 36.29% more alternative measures are pronounced.

Conclusion

From this analysis it is concluded that in the Republic of North Macedonia in 2022 there is an increase in the pronounced alternative measures of 0.01% compared to 2021, while compared to

[39] Direction of prison administration Data Office, Ministry of Justice **(May, 2023), Statistical series of people placed under the custody of justice 1980 – 2022**

2020 there is a decrease in the pronounced alternative measures of 2.55%. The Republic of Croatia in 2022 has a significant increase in the pronounced alternative measures by 14.24% compared to 2021, while compared to 2020 there is an increase of 14.06%. In France in 2022 there is a decrease in the pronounced alternative measures of 0.39 % compared to 2021, while compared to 2020 there is an increase of 1.31 %.

From this analysis, it can be concluded that all three countries aim to use the prison sentence, when there are opportunities and conditions, as an ultima ratio, because they increasingly believe that with the imposition of alternative measures and sanctions and with probation, resocialization can be achieved much more success. Although the analysis shows that the Republic of North Macedonia, in comparison with Croatia and France, imposes more punishments than alternative measures, but nevertheless all countries believe in the positive effects that probation brings with them and above all they believe that by applying them a greater result will be achieved and that is reduction of criminality.

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Machine Learning in Mortgage Scoring: A Comparative Analysis with Traditional Statistical Methods

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Abstract: This paper delves into the comparative advantages of machine learning over traditional statistical methods in real estate mortgage scoring. By examining the efficiency, robustness, and productivity gains of machine learning, the study underscores its potential to transform the financial industry, particularly in mortgage application processing. The findings highlight the reduced need for extensive data preprocessing with machine learning and its implications for faster and more accurate mortgage decision-making.
Keywords: Machine Learning, Real Estate Mortgage, Financial Industry, Data Preprocessing, Traditional Statistical Methods.

Introduction

The evolution of machine learning (ML) has brought about significant changes in various sectors, including the financial industry. While traditional statistical methods have been effective, they often necessitate extensive data preprocessing and manual intervention. This paper aims to explore the advantages of machine learning over these traditional methods, especially in the realm of real estate mortgage scoring within large banking institutions.

Beyond the question of predictive performance, machine learning methods offer undeniable advantages over traditional parametric scoring approaches. These advantages include significant productivity gains, reduced time for data management and preprocessing, and the ability to handle missing values, strong correlations, and other data issues. The traditional approach of a statistician involves multiple steps, from data treatment to variable selection. In contrast, machine learning algorithms, such as classification trees and random forests, simplify these processes by autonomously determining optimal groupings and handling correlated predictors. The financial industry is increasingly recognizing these benefits, with studies highlighting the robustness and efficiency of machine learning methods.

Literature review

This paper explores the application of machine learning in analyzing real estate market trends. The authors collected historical property transaction data and utilized clustering algorithms to identify market segments based on location, property type, and price range. The study aimed to identify emerging market trends and predict demand and property value shifts. Results showed that machine learning could effectively identify market patterns and provide valuable insights for real estate investors and developers (Anastasopoulos, 2019) .

The study provides valuable insights into using machine learning for real estate market trend analysis. However, it would have been beneficial to include a comparison with traditional

statistical methods to assess the added value of machine learning in identifying market trends. Additionally, the study did not address potential biases in the dataset, which could affect the accuracy of the results.

This study focuses on applying machine learning techniques to improve the accuracy of property valuation in the commercial real estate sector. The authors collected commercial property sales and lease agreement data and used regression models to predict property values based on various attributes. The study demonstrated that machine learning algorithms can enhance property valuation accuracy and provide real estate professionals with more reliable appraisal tools (Baldominos et al., 2018) .

The case study highlights the potential of machine learning in enhancing property valuation in the commercial real estate sector. However, the study did not discuss the potential challenges in acquiring reliable data on lease agreements and the impact of lease terms on property valuation. Additionally, the authors could have included a comparison of different regression models to determine the most suitable approach for commercial property valuation.

This research investigates the use of machine learning to predict property investment risks. The authors collected data on property prices, rental yields, and economic indicators and employed classification algorithms to assess the risk associated with specific investment properties. The study aimed to provide investors with valuable risk assessment tools to make informed investment decisions. Results indicated that machine learning could effectively identify high-risk investment opportunities and contribute to more prudent investment strategies.

The research provides valuable insights into using machine learning for property investment risk analysis. However, the study could have incorporated qualitative data such as local market conditions and regulatory changes to enhance risk assessment accuracy. Additionally, the study did not assess the impact of model interpretability on investors' decision-making process, which could be crucial for gaining trust in machine learning-driven risk assessments.

This comparative analysis examines the application of machine learning algorithms in property maintenance scheduling (Anastasopoulos, 2019) . The authors collected data on building maintenance histories and utilized decision tree models to predict optimal maintenance schedules for different property types. The study aimed to identify cost-effective maintenance strategies to prolong the lifespan of building components and reduce operational expenses. Results demonstrated that machine learning can significantly improve maintenance scheduling efficiency and reduce maintenance costs (Baldominos et al., 2018) .

The comparative analysis offers valuable insights into using machine learning for property maintenance scheduling. However, the study focused solely on decision tree models, and a broader range of machine learning algorithms could have been explored for comparison. Additionally, the study did not address the potential challenges in implementing machine learning-driven maintenance schedules, such as the need for data integration from different building systems.

Baldominos et al. (2018) investigate the use of machine learning in assessing the sustainability of real estate developments. The authors collected data on building energy performance, water usage, and waste management practices and employed clustering algorithms to evaluate the sustainability of different developments. The study aimed to provide developers with a comprehensive sustainability assessment tool to enhance their decision-making process. Results indicated that machine learning can effectively categorize developments based on their environmental impact and assist in identifying areas for improvement (Baldominos et al., 2018) .

The study provides valuable evidence of the potential of machine learning in sustainability assessment for real estate developments. However, the study did not consider social and economic sustainability aspects equally essential in comprehensive sustainability assessments. Additionally, the authors could have included a validation of the clustering results against established sustainability certifications to evaluate the accuracy of the machine learning-driven assessment.

Čeh et al. (2018) focus on predicting residential building energy consumption using machine learning techniques. The authors collected historical energy consumption data from a residential complex and applied time-series forecasting models like Auto Regresive Integrated Moving Average (ARIMA) and Prophet to predict future energy demands (Choy & Ho, 2023) The study aimed to identify patterns and factors influencing energy usage, providing homeowners and

property managers with insights for optimizing energy efficiency.

Results showed that machine learning models can accurately forecast energy consumption and aid in developing targeted energy-saving strategies (Čeh et al., 2018). The longitudinal study contributes valuable insights into predicting energy consumption in residential buildings using machine learning. However, the study could have explored additional machine learning algorithms, such as Long Short-Term Memory Networks (LSTM), for time-series forecasting to compare their performance with the selected models. Additionally, the authors did not discuss the potential impact of weather variations on energy consumption predictions, which could be essential for robust forecasting.

Choy & Ho (2023) investigate the use of machine learning in optimizing green roof designs for sustainable buildings. The authors collected climate data, building attributes, and green roof performance information and employed optimization algorithms to determine the most effective green roof configurations for different climates. The study aimed to enhance green roof design efficiency and promote environmentally responsible building practices. Results indicated that machine learning-driven optimization can significantly improve green roof performance and contribute to urban sustainability (Choy & Ho, 2023) .

The research offers valuable insights into using machine learning for green roof design optimization. However, the study could have included an analysis of the economic feasibility of the proposed green roof configurations to assess their practicality for real-world applications. Additionally, the authors did not consider factors such as maintenance costs and the potential impact of different green roof designs on overall building aesthetics, which are essential considerations for developers and building owners.

Díaz (2019) explores using machine learning algorithms to predict occupancy patterns in commercial real estate properties. The authors collected data on tenant leases, historical occupancy rates, and economic indicators and utilized time-series forecasting models to predict future occupancy trends. The study aimed to provide property managers and investors with valuable insights for optimizing lease renewal strategies and occupancy rates. Results demonstrated that machine learning can effectively predict commercial property occupancy and aid in developing targeted tenant retention strategies (Díaz, 2019)

The study provides valuable evidence of the potential of machine learning in occupancy prediction for commercial real estate. However, the study could have incorporated additional features, such as tenant satisfaction surveys and local economic conditions, to enhance the accuracy of the occupancy predictions. Additionally, the authors did not address potential challenges in data collection and integration for occupancy forecasting, which could be significant hurdles in real-world implementation.

Foryś (2022) focuses on using machine learning algorithms to classify land use patterns for urban planning purposes. The authors collected satellite imagery and urban development data and employed Convolutional Neural Networks (CNNs) for land use classification. The study aimed to provide urban planners with a more efficient and accurate approach to analyzing land use changes and developing sustainable urban development strategies. Results demonstrated that machine learning-driven land use classification can significantly improve urban planning outcomes (Foryś, 2022).

The research offers valuable insights into using machine learning for land use classification in urban planning. However, the study could have discussed the computational requirements and resource constraints associated with CNN models, which could be a significant consideration for large-scale applications. The authors did not assess potential errors or limitations in the CNN-based land use classification. They could have included a comparison with traditional land use mapping approaches for validation.

Discussion

Traditional statistical methods involve a multi-step process, starting with data preprocessing and culminating in variable selection for scoring models. This often requires manual intervention and expertise. Machine learning, on the other hand, offers a more streamlined approach. Algorithms like classification trees and random forests autonomously handle data preprocessing tasks, making them more efficient. The financial industry is beginning to see the benefits of this approach, with fintechs leveraging machine learning to process mortgage applications faster and with fewer biases. This shift towards machine learning signifies a move towards increased automation and efficiency in the mortgage granting process.

The application of machine learning in the financial sector, particularly in real estate mortgage scoring, has opened up a new frontier in decision-making processes. Traditional statistical methods, while having served the industry for decades, come with inherent limitations, especially in the face of complex, high-dimensional data that characterizes modern financial systems.

One of the most significant advantages of machine learning is its adaptability. Unlike traditional methods that rely on predefined assumptions about data distributions or relationships, machine learning algorithms can adapt to the data they are given. This is particularly crucial in the financial world, where economic conditions, regulatory landscapes, and consumer behaviors are constantly evolving. Machine learning models can be retrained with new data, allowing them to evolve and adapt to changing circumstances.

Furthermore, machine learning's ability to handle vast amounts of data in varied formats (structured and unstructured) gives it an edge. In the age of big data, financial institutions have access to a plethora of information, from traditional credit scores to social media activity, online behaviors, and even geolocation data. Machine learning can integrate and analyze these diverse data sources to provide a more holistic view of a mortgage applicant's creditworthiness.

Another area where machine learning shines is in its ability to uncover non-linear relationships and interactions between variables that might be overlooked by traditional methods. For instance, while a traditional model might consider an applicant's income and debt separately, a machine learning model could identify complex interactions between these factors, combined with other variables, to predict the likelihood of a loan default more accurately.

However, it's essential to acknowledge the challenges and criticisms associated with machine learning. The "black box" nature of some algorithms can make it difficult to interpret and understand the rationale behind decisions. This lack of transparency can be a concern in the financial sector, where institutions need to explain their decisions to both regulators and customers. Moreover, while machine learning can handle vast amounts of data, the quality of that data is paramount. Biased or incomplete data can lead to biased predictions, perpetuating existing inequalities.

In the broader context, the adoption of machine learning in mortgage scoring can have profound implications for society. By making the mortgage approval process more efficient and accurate, it has the potential to increase homeownership rates, especially among historically underserved populations. On the flip side, there's a need for robust regulatory frameworks to ensure that these algorithms don't inadvertently discriminate against certain groups.

In conclusion, while machine learning offers promising advantages over traditional statistical methods in mortgage scoring, a balanced approach that considers both its potential and challenges is crucial. As the financial industry continues to evolve, ongoing research, collaboration between technologists and financial experts, and robust regulatory oversight will be essential to harness the full potential of machine learning while safeguarding against its pitfalls.

Conclusion

Machine learning presents clear advantages over traditional statistical methods in the context of real estate mortgage scoring. By minimizing the need for manual data preprocessing and offering a more genuine representation of raw data, machine learning is set to play a pivotal role in the future of the financial industry. As the sector evolves, embracing machine learning will be essential for institutions aiming to remain innovative and efficient.

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Revolutionizing Real Estate Mortgage Scoring: The Superiority of Machine Learning Over Traditional Statistical Methods

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Abstract: This paper explores the advantages of machine learning over traditional statistical methods in the context of real estate mortgage scoring. While traditional methods require extensive data preprocessing, machine learning offers a more streamlined and efficient approach. The financial industry is recognizing these benefits, with machine learning enabling faster mortgage application processing and reduced modeling biases. The findings underscore the potential of machine learning to revolutionize the financial sector.

Keywords: Machine Learning, Real Estate Mortgage, Financial Industry, Data Preprocessing, Traditional Statistical Methods.

Introduction

The evolution of machine learning (ML) has revolutionized various sectors, including the financial industry. Traditional statistical methods, while effective, often require extensive data preprocessing and manual intervention. Machine learning, with its ability to autonomously process and analyze data, offers a promising alternative. This paper delves into the advantages of machine learning over traditional statistical methods, particularly in the context of real estate mortgage scoring within large banks.

Literature review

Beyond the question of predictive performance, machine learning methods have an undeniable advantage over the usual parametric scoring approaches since they allow significant productivity gains. In particular, machine learning algorithms make it possible to reduce the time devoted to the data management and preprocessing stages before the modeling stage in a strict sense (Milunovich, 2019) 40. Of course, this does not mean that machine learning makes it possible to dispense with the work of construction and data quality control, which remains necessary.

To fully understand this point, let's return to the traditional approach of a statistician in charge of building a scoring model real estate mortgage within the risk department of a large bank. The

[40]Milunovich, 2019

first step of his work is to apply different treatments to the training data. Among these is the processing of missing or outlying values, which requires the implementation of detection, imputation, and exclusion procedures. The other treatments generally concern categorizing categories of the discrete explanatory variables and discretizing the continuous variables. For each of the qualitative variables, the modalities are grouped in such a way as to reduce the number of classes and maximize the discriminating power of the variable. All the continuous explanatory variables are discretized (Milunovich, 2019) 41.

On the one hand, this is to capture potential non-linear effects and, on the other hand, reduce the influence of extreme values or uncorrected outliers. The number of classes and the discretization thresholds are determined by iterative algorithms built to maximize a measurement of Cramer's V type association or chi-square statistic, between the target variable (the default) and the explanatory variable. The second step consists in analyzing the correlations between the predictors to verify that these variables are not too correlated with each other. Depending on these correlations, the expert then removes certain redundant variables according to the principle of parsimony. The third step is the selection of the explanatory variables of the score model (Milunovich, 2019) 42. Under a given scoring model (e.g., logistic regression), we select from among all the reprocessed variables the best predict the default. Depending on the number of variables available, this selection can be made manually or using automatic approaches such as stepwise. The automatic selection is often complemented by business expertise and a finer analysis of the model (marginal effects, odds ratios).

Conversely, using a classification tree or tree-based algorithms, such as random forests, renders discretizing continuous variables and grouping categories obsolete. These techniques autonomously determine the optimal discretization and groupings of modalities (Stang et al., 2022) 43. Analyzing correlations between predictors is less crucial because most machine learning algorithms can integrate strongly correlated predictors. Penalized regression methods such as the Lasso or the Ridge precisely make it possible to select the relevant variables and overcome multicollinearity. More generally, the advantage of machine learning algorithms is precisely to use the data to determine the optimal functional form of the model in the sense of a certain criterion. This, therefore, renders the step of selecting the explanatory variables of the score model obsolete.

These productivity gains associated with machine learning are now highlighted in the financial industry (Stang et al., 2022) 44. Grennepois et al. (2018) 45 highlight the fact that the predictive performance of random forests is generally robust to the non-imputation of missing values, to the presence of strong correlations between certain explanatory variables, to the non-grouping of the modalities of the discrete variables, and to the non-discretization of the continuous variables. This robustness, therefore, potentially makes it possible to limit the preprocessing steps on the data.

Beyond productivity gains, limiting pre-processing of the data can also reduce any modeling biases since, in the end, machine learning lets the raw data do the talking. Machine learning thus allows increased automation of real estate mortgage granting processes, including in the construction phase and revision of risk models. Considering data on the processing time of mortgage applications in the United States, Fusteret al. (2018a) 46 show that Fintechs process mortgage applications around 20% faster than other lenders, and this is without a noticeable deterioration in the quality of mortgage selection.

[41]Ibid
[42]Ibid
[43]Stang et al., 2022
[44]Ibid
[45]Grennepois et al., 2018
[46]Fusteret al., 2018a

Discussion

Traditional statistical approaches involve multiple stages of data preprocessing. A statistician would first treat training data, handling missing or outlying values, categorizing discrete explanatory variables, and discretizing continuous ones. The aim is to maximize the discriminating power of each variable. Subsequent steps involve analyzing correlations between predictors, removing redundant variables, and selecting the most relevant explanatory variables for the scoring model.

In contrast, machine learning offers a more streamlined approach. Algorithms like classification trees or random forests eliminate the need for discretizing continuous variables or grouping categories. They determine the optimal groupings autonomously. Moreover, machine learning algorithms can handle strongly correlated predictors, making the analysis of correlations less critical. Penalized regression methods, such as Lasso or Ridge, address multicollinearity and select relevant variables. The inherent advantage of ML is its ability to determine the optimal functional form of the model using the data, rendering the step of selecting explanatory variables obsolete.

The financial industry is beginning to recognize these productivity gains. Machine learning's robustness to various data issues, such as missing values or strong correlations between variables, reduces the need for extensive preprocessing. This not only results in productivity gains but also minimizes modeling biases, allowing for a more genuine representation of raw data. The automation capabilities of ML have also been observed in the real estate mortgage granting processes. Fintechs, leveraging ML, have been shown to process mortgage applications faster without compromising the quality of mortgage selection.

Conclusion

Machine learning offers undeniable advantages over traditional statistical methods, especially in the realm of real estate mortgage scoring. By reducing the need for extensive data preprocessing and offering a more genuine representation of raw data, ML is poised to revolutionize the financial industry. As the sector continues to evolve, embracing machine learning will be crucial for institutions aiming to stay at the forefront of innovation and efficiency.

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Lifelong Maintenance Contract in Kosovo: Regulatory Framework, Implementation and Judicial Challenges

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Abstract. According to Kosovo Law No. 04/L-077 on Obligation Relations, lifelong maintenance occurs when one contracting party (the maintaining party) undertakes to support the other contracting party or any other person (the maintained party), and the other contracting party declares that he/she will leave the former all or part of his/her property, which includes real estate and movable property intended for the use and enjoyment of the real estate, and the delivery thereof is postponed until the former dies. To provide a thorough examination taking into account its origins, developments, and how it responds to practical situations, this paper is divided into three sections. The first section investigates the concept of lifetime maintenance contracts, a relatively new named contract in Kosovo, as well as their significance in obligations legislation. The second section delves into the regulatory framework that governs these contracts, while the third section examines their practical implementation and the challenges encountered in court.

The study aims to shed light on the framework's legal guarantees and the potential for abuse in its narrow interpretation.

Keywords: Lifelong maintenance contract, Kosovo, legal framework, judicial practice

Introduction

The agreement for lifelong maintenance represents a unique contractual arrangement characterized by reciprocal rights, obligations, and remuneration, thereby constituting a formal and aleatory contract. This contractual paradigm serves as an effective solution for individuals unable to self-care due to factors such as old age or illness. However, it is not without drawbacks, potentially posing challenges in penalizing necessary potential heirs due to strained family relations. As per Articles 560–565 of the Kosovo Law on Obligations Relations No. 04/L-077(LOR), which came into effect on December 20, 2013, both parties have a mutual obligation to transfer the contracted property upon the demise of the maintained party and provide life support or assistance to the maintaining party from the time of the contract's inception until the maintained party's death. This support may take the form of a financial commitment, an annuity, or non-monetary support, emphasizing care, personal sustenance, health care, recreational activities, and other essential needs throughout the maintained party's life. In tandem, the party that is being maintained promises to transfer all or a portion of their assets, including both immovable and movable property (LOR, Article 560). Crucially, as stated in paragraph 1 of Article 560 of the Kosovo Law on Obligations Relations, the transfer of ownership cannot occur until the death of the maintained party. While this contract appears well-defined and straightforward, it is crucial to emphasize that in Kosovo, it represents a novel contractual arrangement that has given rise to various life situations and necessitated interpretative efforts. This paper's primary focus is navigating the legal complexity of this contract and delving into the most debated issues concerning the status of the contract parties and their aims in entering into this contract. Specifically, it scrutinizes the extension of the primary obligation of the maintained party to transfer their property to the maintaining party, whose support obligation requires clarification due to the used terminology by national legislation terminology.

The second section of the paper undertakes an analysis of the contract, emphasizing a comparative approach with the legal regulations in Kosovo in contrast to other developed legislations such as the German Civil Code, Swiss Civil Code, and obligations law in Croatia, Albania, Montenegro, etc. The objective is to discern whether practical challenges are attributable to the formulation of provisions or if there are inherent issues that still need incorporation into the law.

Last but not least, a significant concern surrounding this contract revolves around its potential misuse for ulterior motives. This predicament arises firstly due to the limited legal provisions and secondly, from challenges in manifesting the genuine intentions of the parties. The contract has been exploited to circumvent legal heirs, underscoring a critical issue that warrants attention.

Methodology

To achieve the goals outlined in this paper, a comprehensive methodology that combines doctrinal legal analysis with a comparative approach will be used.

The first component of the methodology is an in-depth doctrinal legal analysis. This approach will examine the provisions of the lifelong maintenance contract, as outlined in Kosovo Law on Obligations Relations No. 04/L-077 (LOR). The analysis will include an examination of the contract's legal implications, rights, and obligations. Particular emphasis will be placed on clarifying ambiguous terms and addressing the complexities that have emerged in practice. The second component of the methodology uses a comparative legal analysis, which entails a thorough examination of Kosovo's legal framework governing lifelong maintenance contracts, as well as a comparison with similar legislation, such as the German Civil Code and other European laws. The goal is to identify potential gaps, inconsistencies, or solutions in other jurisdictions to help inform and improve the contract's interpretation and application in Kosovo. Also, a case study approach will be used to ground the analysis in practical scenarios. Notable cases and incidents in which the lifelong maintenance contract has been contentious or abused will be investigated. This empirical aspect will provide real-world examples to supplement the theoretical legal analysis and contribute to a more complete understanding of the issues.

Results

Crucial Elements of the Contract

The legal landscape surrounding the contract for lifelong maintenance adds a layer of intricacy to its nature. This complexity is underscored by the meticulous legal framework governing its formation and execution.

The provisions of the Law on Obligation Relation in Kosovo for this contract do not specifically define any restrictions on who may be the subject of this agreement or on the qualifications of those involved in its conclusion, either on the part of the maintained or maintaining party. The subjects participating in this mandatory legal relationship may be any natural or legal person with the capacity to act, — even in cases where such capacity has been acquired through emancipation — and are eligible to do so, following the general rules of compulsory law. Physical persons must legally possess the full capacity to act before entering into a contract in the maintenance giver's or holder's capacity (they should, in theory, also be able to fulfill their obligations). In terms of the ability to enter into a contract, only individuals who possess full legal capacity — even in cases where such capacity has been acquired through emancipation — are eligible to do so.

Legal literature and judicial practice do not support the notion that an incapacitated person cannot, through their legal representative, provide maintenance due to age or other reasons. It is implied that many of the maintenance provider’s obligations are personal by the definition of the maintaining party obligations in Article 560 paragraphs 1 and 3, which state that "... undertakes to support the other contracting party or any other person (the maintained party) ..." and "... that he/she has to fulfill personally. If the maintaining party becomes incapacitated at a later date, the law will treat it as a change in circumstances, and this agreement will remain in effect until the maintained party’s death. According to the legal definition, legal entities can also be parties to this agreement. The law does not state that legal entities cannot provide maintenance for their benefit, which, in our opinion, contradicts the purpose of the contract and the human nature of the individualized support provided by the maintaining party. Legal entities, on the other hand,

can provide maintenance without specific restrictions, and European countries handle maintenance in a variety of ways, often through specialized entities funded by insurance or state funds. The states in the region, Serbia (IL of Serbia, Article 196) and Montenegro (LOR of Montenegro, Article 1077), stipulate that a contract is deemed void if the Custodial Body's approval is not acquired before its completion. According to these jurisdictions' regulations, the maintaining party is a natural or legal person who looks after the maintained party's recipient (medical staff, hospitals, various agencies, and similar) while acting within the bounds of their respective professions. Furthermore, the Swiss state stipulates in paragraph 2 of article 522 of the Civil Code that any contract on a legal person that the state has legally recognized must be made only under terms that have been approved by the appropriate authority. The legal provisions governing this contract in other countries, like Croatia, Bosnia and Herzegovina, Albania, and North Macedonia, do not specifically define any limitations regarding the legal entity as the maintaining party.

As previously stated, following the general provisions of the LOR for the conclusion of a contract for the benefit of a third person, this contract may also be concluded for that person's benefit. Nonetheless, the particulars of this agreement are dictated by additional clauses that govern it. Even in this model of the lifelong maintenance contract, the maintaining party's legal position remains unchanged.

An additional significant point regarding the status of the parties to the agreement is that it can be presented to multiple parties as the maintaining party and the maintained party, and it can bind individuals, including those legally obligated to provide for one another's needs. This applies to every member of the family as well as those who identify as blood relatives or in-laws. It is unclear from the outset of this contract's implementation in Kosovo's judicial practice whether the parties could be considered family members based on the present unified judicial practice (Supreme Court of Republic of Croatia (Rev. 1518/87 & Supreme Court of FBH Ac. 1712/67). In most cases, the people involved are either parents and children or spouses living together. The individuals involved are typically either cohabiting spouses or parents and children. The party providing the maintaining party is liable to the recipient of the maintained party jointly because the object of their obligation constitutes joint property. Even if only one spouse signs the contract and the obligation is satisfied by joint property and joint actions, the maintained party and the respectable spouse own the property acquired in exchange for maintenance compensation. This is because the contract is considered to be a mortis causa contract, which means that even after the maintained party passes away, the property is deemed to have been acquired with their joint contribution (LOR, Article 560). Even if the maintained party transfers actual possession of the property covered by the contract to the holder for life, the obligation cannot be fulfilled while the maintained person is still alive and before his or her death. Moreover, the term of this agreement cannot be shorter than the lifetime of the maintained party, or the maintenance recipient.

Another issue under discussion is the object of the parties' obligations, which are determined by the law under the term "the entire general property or a part of it and the movable property dedicated to use and enjoy this property or the movable property as the only one". Based on judicial interpretations and analyses. According to the legal text, article 560 of LOR, "general property" can be defined as all forms of external manifestation of wealth, including items, economic values, money (as financial assets), and other property rights (Aliu, 2014). According to the interpretation of the commentary of LOR, if the term "immovable property" were used instead of "general property", the content of the property would be limited to immovable. If the term "immovable property" were used instead of "general property", the property's content would be limited to immovable and movable property, even though the maintained party's obligation is typically the right of ownership over immovable and movable property. This has been supported by judicial decisions (The European Court of Human Rights, Case of Marckx v. Belgium, 1979), and other property rights (money, intellectual property rights, company shares, et cetera may also be considered an obligation. The European Convention on Human Rights, on Article 1 of Protocol 1, only uses the expression "Property"; the German, Italian, and Swiss Civil Codes use the expression "Property" ("Vermogen"); also in the law of the states of the region as Croatia, North Macedonia, Montenegro, FBH, and Serbia is expressly specified as "certain items or other rights".

After the death of the maintained party, the maintaining party is not responsible for the debts related to him. However, the contract can explicitly state that he is responsible to the creditors of the retainer for the debts existing at the time of the contract's conclusion (LOR, Article 563).

According to the Kosovo Law on Inheritance, the heir, as a universal successor, will inherit both the rights and the obligations, whereas this contract only transfers the subjective rights of ownership over the property to the maintaining party upon the death of the other party.

The asset subject to the contract cannot be used, taken possession of, or harvested until the maintained party's death unless the retainer voluntarily relinquishes use of this asset in favor of the maintenance provider (LOR, Article 562).

Misuse of the Contract Aims: Judicial Solutions

The main concerns related to misuse of the contract to reduce the amount of property that would be inherited after the death of the maintained part. According to Perović (1971), a contract can have a fictitious basis if the parties intentionally conceal its true basis from third parties. Parties enter into a contract for the public while concealing another, such as when the parties enter into a contract to avoid paying taxes or when a simulated contract is entered into, which is presented to the public as a contract for the gift but is a contract for the sale and purchase (Loza, 1981; Milosevic, 1977). If the contract's basis is missing, fictitious, or prohibited, the contract is completely invalid (LOR Commentary, Article 50, 2013). Article 50, paragraph 1 of Kosovo's Law on Obligations, states that fictitious contracts have no effect between the contracting parties. The law considers these contracts to be legal works concluded in the absence of will. A conscientious third party cannot be told that the contract is fictitious (Article 50, paragraph 3 of LOR).

According to Kosovo's Law on Obligations, article 50, paragraph 1, fictitious contracts have no effect between the contracting parties. These contracts are classified by the law as legal works concluded in the absence of will. A conscientious third party cannot be told that the contract is fictitious (LMD, Article 50, paragraph 3).

Contracts for lifelong maintenance tend to be simulative, in which the contracting parties decide to declare something they do not want to achieve a legal goal while concealing the true will. Absolute simulation and relative simulation are distinct concepts in legal doctrine. Absolute simulation occurs when the parties do not wish to enter into a contract but want to give the impression to others that one exists. Puhan (1970) defines relative simulation as when parties sign a contract in person but intend to sign another one. If the contract conceals another contract, according to Article 50, paragraph 2 of the LMD, the second contract is valid if the conditions for its legal validity are met (LMD Commentary, Article 50, 2013). If the contracting parties are oriented toward the conclusion of the contract on the gift while the contract for lifelong maintenance is concluded, the contract for lifelong maintenance is considered to be a contract on the gift rather than absolutely invalid. This does not imply that all established contracts for lifelong maintenance would automatically be changed to gift agreements (Bikić & Brkić, 2010).

To determine if the parties will be donating rather than maintaining, all relevant circumstances must be considered in addition to the purpose of donation (animus donandi), such as whether the maintained party truly needs it, if the contracting parties are also legally obligated for mutual maintenance, and so on (Antić & Balinovac, 1996). Furthermore, according to the Supreme Court of Croatia, Rev. 2229/87, this contract must provide a disproportionate and certain benefit to the grantor from the outset for it to qualify as a gift agreement. In the case of a conscious inconsistency between the will and the declaration, it is considered grounds for disputing the contract's validity. In practice, proving these reasons for contract cancellation is not always easy. Judicial practice has made significant contributions in this direction. So, the Supreme Court of Kosovo has given its contribution in this direction through its decision GZ-355/74 in which it is stated that "The contract for lifelong maintenance, which the parties conclude not to give or receive maintenance, even in the prescribed legal form, aiming to avoid the rights of future heirs, is contrary to the spirit of the Law on Inheritance and moral conduct, and such is invalid and produces no legal effect (Supreme Court of Kosovo). In the same vein, even if the maintained party has had an impermissible motive as the initiator of the contract for lifelong maintenance, of which the maintaining party was aware, the contract for lifelong maintenance will be declared invalid (Supreme Court of (Supreme Court of Serbia, Rev. 456/06, 2006).

Based on these legal requirements, which are well defined but difficult to prove in each case, we believe that one of the factors that can contribute is noters. Because these agreements must be signed in front of a notary, they must identify the parties' purposes as well as their ability and authority to take legal action, according to Article 33 of the Law on Notaries. The notary

establishes the parties' expressed intention and then gives the parties the required legal support by outlining the relevant legal framework and the effects of the concrete transaction for the law. In a nutshell, there is no missing legal instrument in the law provisions that can solve this problem. The human factor is still the only way to find a solution, as it keeps track of each party's intentions and aligns them with the objectives of the contract.

We base our reasoning on the standards of case resolution, highlighting the contractual goal and the general good faith principle, or "bona fede".

Other jurisdictions

In the analysis of legislation, a meticulous examination of criteria or elements is undertaken to identify similarities or contradictory relationships. One focal point involves delineating the property benefits provided by support providers, with a specific emphasis on distinguishing between annuity and support in jurisdictions like Switzerland, and understanding property rights as stipulated by the European Convention on Human Rights (ECHR). Notably, a critical consideration involves the inclusion of provisions for rewarding maintenance throughout the supported person's lifetime, as exemplified by the legal framework in Croatia. Moreover, the practice of registering contracts in the Immovable Property Register is observed in various jurisdictions, including Croatia, Bosnia and Herzegovina, and Montenegro, among others. An additional nuanced aspect under scrutiny is the lack of equivalence between prestations and the right to terminate contracts, as observed in Switzerland. This distinction is emphasized, particularly in contrast to condition alterations, highlighting the intricacies within the legal frameworks being compared. Such a thorough exploration of these elements serves as the foundation for a comprehensive understanding of the legislative landscape surrounding support provision, ensuring a nuanced comparison that accounts for the intricacies within each jurisdiction.

Many jurisdictions do not explicitly include a lifelong maintenance contract in their legislation or have removed it; however, society's need to formalize the termination of this contract is demonstrated through alternative means. Even so, a large number of nations view this accord and implement it under their own legal systems. Different jurisdictions include this contract in different ways. This contract is defined in each of the jurisdictions under review as a named, two-sided, reward contract with reciprocal rights and obligations as well as continuing loans from the retention provider. It is usually classified as obligatory law in modern European law. As an alternative, nations like the Republic of Kosovo, North Macedonia, Switzerland, Croatia, and Montenegro have combined it with other contracts under the purview of obligatory law (LOR). Serbia and the Federation of Bosnia and Herzegovina (FBH) are two of the states in the region that have included it in their inheritance laws (LI). Furthermore, it is described as an official and aleatory contract with legal consequences in the event of the maintained party’s death, an uncertain event.

The legal definition of some aspects of contracts differs from the Kosovo LOR, and this has different legal implications for the parties to the contract as well as other parties. The entities eligible to enter into this legally binding relationship and their capacity to do so remain unchanged, which is important to emphasize. This contract may also be entered into by people legally obligated to provide mutual maintenance, as stated explicitly in the LI of FBH. However, the Swiss Civil Code (SCC) states that if the maintaining party is designated as the maintained party's heir, the relationship will be governed by the terms of the inheritance contract.

There are variations in the definition of the contract, the timetable for completing reciprocal duties among the parties, the length and nature of the maintenance obligation, and safeguarding the rights of the contracting parties or the third party for whose benefit the maintenance is contracted when comparing changes across jurisdictions.

Unlike the LOR of Kosovo (Article 560, paragraph 3), the other jurisdictions examined lack any defining provisions for this contract. Instead, they define it through provisions outlining mutual rights and obligations. The first paragraph of the first article governing the relevant contract typically states this. Despite this, we consider named contracts to be determined by the content of the rights and obligations outlined in the law provisions and their intended purpose. So, any agreement that seems, by its terms, to be a lifetime maintenance agreement, given its obligations, rights, and goals, will be interpreted as such, regardless of the agreement's formal name.

According to the legal definition of the LOR of Kosovo (Article 560), the fulfillment of the

obligation on the part of the maintained party is expressly postponed until the moment of his death, namely the acquisition of items and other rights from the maintaining party, which is postponed until the former's death. This arrangement is also present in Croatia's LOR, Montenegro, North Macedonia, and Serbia's LI. At the time of contract conclusion, the LOR of Croatia has regulated it with specific provisions known as the "Contract for Maintenance until

Death," provided the maintained party fulfills their obligations during their lifetime. The Swiss Civil Code and the FBH Law on Inheritance provide that the maintained party is legally bound to fulfill their obligations at the time of contract conclusion. However, Article 146, paragraph 3 of the LI of FBH permits a separate clause that enables the parties to delay the transfer of property by contract until the maintained party's death. Particularly if the maintaining party dies before the recipient, the moment of property transfer by the maintained party has specific legal ramifications for both the contracting parties and other parties. In this case, the property previously given to the maintaining party is inherited by the maintained successors.

Another topic under examination was the maintaining party's obligations, which, following Kosovo's LOR regulation (Article 560), ends upon the death of the maintained party or any third party serving as the beneficiary. The maintaining party is not legally required to perform the funeral rites for the maintained party unless a contract is in place. Only the LI of the FBH (Article 146, paragraph 1) and Serbia (Article 194) envisage this as a legal requirement.

The moments of mutual fulfillment between the contracting parties create ambiguity about the contractual nature and whether it is an inter vivos or mortis causa agreement. In contrast to the Law of Kosovo, states lacking a moment of property transfer, like Croatian law through two kinds of contracts, in contrast to Kosovo's LOR, other jurisdictions — like Croatian law, which is based on two different contract types — that lack a moment of transfer of property have managed this matter by protecting contractual rights. By registering the contract in the public book, the maintaining party can guarantee his claim to the property object of the agreement, as the model foreseen with the LOR of Montenegro in paragraph 1 of Article 1080. This right also helps the stipulent, the third party to whom the maintenance is contracted following the contracting party's death. The maintaining party also enjoys the same rights under the Law of North Macedonia (LOR, Article 1031), the Law of Inheritance of FBH (Article 148), the Law of Inheritance of Serbia (Article 199), and the Croatian LOR (Article 581). Regarding this, the Swiss Civil Code regulates insurance in article 523, which states that "the maintaining party has the right of lien on that property, in the same way as the seller, if the maintained party has transferred to him immovable property," and that "if the maintained party passes away before the maintaining party, the latter has the right to claim against the heirs, as would be the case if the maintained would bankrupt". Furthermore, the maintained party may register the right of mortgage on the property he has transferred to the maintaining party to secure his claims, according to Article 837, paragraph 1 of the Swiss Civil Code.

This paper's other objective is to analyze the provisions about the maintained party's obligation under all the studied jurisdictions. The findings allow us to conclude that, unlike other countries' jurisdictions (LOR of Montenegro, Article 1075, paragraph 2; LI of Serbia, Article 194, paragraph 2), the Kosovo Obligations Law is not unambiguously and precisely defined. The only clarification remains the formulation of the maintained party’s obligation as "property that exists at the time of the contract's conclusion", following the understanding of property rights guided by Protocol 1 of the European Convention on Human Rights (ECHR). FBH's Inheritance Law, as per Article 146, paragraph 6, emphasizes the property owned by the maintained party at the moment of contact conclusion since any property acquired after the agreement and not included in its original purpose will be considered part of their inheritance. This does not mean that future property cannot be part of a contract unless the future property is explicitly stated in the agreement. As a result, future property may be the subject of the contract, but only if it is made clear at the time of agreement. Additionally, since it is required and necessary for the property to be precisely defined, future property unknown at the time of the contract conclusion cannot be the object of this contract obligation. Finally, in a separate pillar, the contract requirements are examined, which specify the form of the contract, the conditions and legal ramifications of contract breaches, debt liability, or annuity changes. They are outlined in Kosovo Law on Obligations, and it has been found that there are no significant differences from other jurisdictions. Although the Law on Obligations lists the form of the contract as a special requirement for validity, the contract is nonetheless subject to the general rules if the contract is invalid. Regarding the possibility of early termination of the contract, it is considered possible based on the parties' free will and subject to the general condition that it be made in the legal form in which it was concluded; otherwise, it is invalid. Thus, the parties may express their

renunciation of the concluded contract utilizing a new agreement of their choosing, known as a mutuus dissensus, which will sever the old one. According to Mijacic and Cvetanovic (1983), all of this must be implied before the obligations are fully met. Because of the aleatory nature of this contract, the parties may obstruct each other to force the other party to request the contract's termination. The reasons for this are that the maintaining party obligations are unknown in terms of how long they will last, which could exceed his estimates based on the maintained party life expectancy, or that after a while, the cost of carrying out the obligations rises, making the value of the maintenance exceed the property covered by the contract, which he receives in exchange for the maintenance provided. An additional factor mentioned in the legal practice is the asset's decline in value and a sharp rise in price following the contract's conclusion, which drives the maintaining party to end the arrangement.

Switzerland has anticipated a restriction on this right, as the maintained party and the maintaining party may terminate the contract for lifelong maintenance within six months of its conclusion under the provisions specified in the Civil Code (Article 526, paragraph 1). Such termination is allowed if, following the contract's conclusion, there is a substantial difference in the value of contributions made by the contracting parties (either in terms of obligations or property) to the point where the party whose contribution is of greater value is unable to verify the donation's intention. Therefore, this discrepancy could not be considered a modification of the situation (SCC, Article 526, paragraph 1). It represents a common standard and rules that in these situations, the parties are entitled to ask for damages compensation as well as the return of the items they provided to fulfill their obligations (Court of Appeal in Pristina, Ac.nr.3560/16).

Conclusions

We conclude that the legal provisions have established the necessary framework to distinguish between the property character of obligations assumed by the maintained subject and the rights of inheritance based on the findings of this paper. It is crucial for judicial practice to emphasize the value of upholding clarity and preventing confusion between these various legal dimensions. To maintain the coherence and fairness of the legal system as a whole, the legal landscape surrounding property rights and obligations must be interpreted precisely and unequivocally.

The differences between the various jurisdictions are evident, especially when it comes to the explicit inclusion of lifetime maintenance contracts in the inheritance or obligation legislation. Different jurisdictions, such as the Republic of Kosovo, North Macedonia, Switzerland, Croatia, and Montenegro, have different classification systems, integration with mandatory or inheritance law, and methods for defining these types of contracts. Disparities in legal definitions and obligations have also implications for the parties involved, with the timing of fulfillment creating ambiguity about the contractual nature. In the exploration of legislation across jurisdictions, the analysis has brought to light diverse approaches and nuanced distinctions within the legal frameworks governing lifelong maintenance contracts. One focal point of examination has been the delineation of property benefits by support providers, emphasizing the contrast between annuity and support in jurisdictions like Switzerland, coupled with an in-depth understanding of property rights guided by the European Convention on Human Rights (ECHR).

By incorporating provisions for the seamless transfer of benefits throughout the supported individual's lifetime, the legal framework ensures a continuous and stable provision of care and assistance. Moreover, the imperative to address unregulated scenarios within the framework is crucial for fostering adaptability and resilience. To fortify the legal structure, it is recommended to include specific provisions that cater to unforeseen challenges and complexities. By doing so, the legal framework becomes more robust, capable of navigating unregulated situations with agility and ensuring that support mechanisms remain effective in varied circumstances.

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