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EFFECTIVENESS AND EFFICIENCY OF MARINE DREDGING  
INSURANCES

the field of economic science, the discipline of finance

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## Summary

The competitiveness of Polish seaports largely depends on the adjustment of the access infrastructure parameters to the constantly increasing technical and operational parameters of commercial ships. Investments in this area are commissioned under public procurement by management boards of port companies and directors of maritime offices as entities responsible for maintaining the access infrastructure to the port from the sea. A key element of each of these types of investments are dredging works. From the point of view of insurance issues, dredging works constitute a very unusual issue combining the issues of maritime risk and the risk related to the construction investment process. When creating comprehensive insurance cover for the contractor of such works, one should be aware of the scope of protection offered by individual insurance products as well as the awareness of the specific risk exposure resulting from the nature of the works and the legal status of the shipowner who is also a construction contractor.

Insurance is an economic device whose theoretical foundations have been comprehensively developed. When describing the insurance mechanism, economic models often assume its very high utility. However, this assumption does not stand up to the economic reality. Cases of low utility of a retail client (consumer). This phenomenon also occurs in the case of enterprises. The sub-optimal utility of insurance can disrupt the entire risk management process, reducing the competitiveness of certain industries. The categories of effectiveness and efficiency find their application in the evaluation of insurance solutions in risk management, which is the main goal of this dissertation. In an attempt to achieve the indicated goal, the main thesis of the thesis was formulated: Effective and effective insurance of marine dredging works requires taking into account the specificity of the risk, both at the stage of drawing up contractual requirements and in the process of negotiating the terms of the insurance contract.

The source data for the research was the tender documentation for tenders for dredging works from 2013-2017, made available through access to public information, by maritime offices and port authorities, and claim records from Polish insurance companies. Due to the fact that the dredging works in Poland are practically not performed for private entities, and there is only one local contractor, and foreign companies most often act as consortium members, it can be assumed that the data used provides an almost complete picture of the local market.

The dissertation consists of four chapters. They describe the construction investment process related to the dredging works from the point of view of insurance issues.

The first chapter systematizes information on the state's activities in the area of investments in the development of infrastructure for access to ports from the sea. In the Transport Development Strategy until 2020 (with a perspective until 2030) that was in force until recently, they constituted a very important element of the broadly understood improvement of the competitiveness of Polish seaports. It translated into a significant demand, in 2014-2020, for investments in this area. The total number of projects related to the modernization of the port access infrastructure from the sea was 11, and their total cost was to amount to PLN 4,141.75 million. This was to account for 36.17% of the value of all investments in maritime infrastructure in Poland for 2014-2020. An indispensable element of these investments were dredging works. Thus, in the context of such high demand, it was justified to make a detailed assessment of the insurance solutions used. For this purpose, the methodology for carrying out the works as well as the formal and legal conditions in which the contractor operates were established.

In the second chapter, the risk assessment of the contractor of the dredging works was carried out based on the ISO 31000 standard. Based on in-depth individual interviews with specialists in the field of dredging works and insurance claim records, key risks related to the performance of the contract were selected and prioritized. The size of the risk was determined based on the product of the assigned point value for the frequency of its occurrence and the size of the loss, on a twenty-five-point scale. According to this method, the greatest risks include damage to vessels caused by force majeure (12 points), accident at work (12 points), damage to the silting pipeline (12 points) and failure / damage to the unit's drive (10 points). Damage to the subject of works, which is the basic issue of insurance protection for construction insurance, achieved a score of 4 points. For all selected risks, the recommended methods of taking it were assigned and those provided for by contractual provisions for three selected contracts.

The third chapter is devoted to the insurability of risk in dredging works based on the risk theory and the discussion of the scope of protection offered by selected insurance products used in the performance of contracts for dredging works. Insurable risk is a pure risk, characterized by uncertainty of occurrence, randomness and the financial dimension of loss. All of the risks selected in chapter two, on the basis of the risk theory, are insurable. In the market realities, however, there are some significant limitations in the insurance coverage that can be purchased. Munich RE terms, used in the general terms and conditions of the CAR insurance, by all insurers on the market, provide for the obligatory introduction of the so-called Wet risk clause (Munich Re Special Endorsement for Wet Risks). Due to the reinsurance restrictions of

insurance companies, it is not possible to take out CAR insurance for sea works without introducing this clause. The unpredictability of this type of risk, a relatively small number of contracts in the scale of an insurance undertaking's operation, difficulty in estimating the value of a loss, and continuous exposure to water mean that damage to dredging works is not covered by insurance coverage based on the Munich standard. Since insurance companies in Poland (as well as in Europe - Munich Re terms are European standard), do not have reinsurance in this area, the risk is not transferred to other financial entities and is taken on the insurers' own reserved portion. It manifests itself in significant difficulties in finding coverage, the need to define a loss each time and establish separate, low limits for this type of events, and implies the need to look for risk management methods outside insurance.

In the case of public tenders, the terms and conditions of insurance are very often defined in advance by the contracting authority. Based on the data on orders from 2013-2017, it has been shown that the required insurance products are not adequate to the risks in the contracts for dredging works. The reason for this is that dredging works are treated in the same way as other construction investments, without considering their specificity. The insurance cover, both in general third-party liability and insurance of all construction risks, was designed with the activity typical for a wide group of recipients in mind. Works taking place on the water with the participation of vessels require considering their formal and legal status and the scope of protection that the shipowner has under the compulsory marine insurance.

The assessment of the effectiveness and efficiency of insurance used in contracts for dredging works is presented in chapter four. The conducted analysis confirms that the insurance of marine dredging works used so far in Poland is characterized by a low level of effectiveness and efficiency. The effectiveness of insurance protection was made from the perspective of the insured, through the prism of the assessment of its adequacy and reality as components of this category. The postulate of efficiency understood in this way, in the context of the implementation of dredging works, is the certainty of obtaining an insurance benefit in the event of significant risks related to the performance of the contract. The basic criterion for assessing the effectiveness of insurance protection was the coverage of the risks selected in chapter two, key risks from the point of view of the contractor of dredging works, by selected insurance products. The assessment of the size and speed of compensation is possible only after determining whether a given insurance corresponds to the extent of the risks related to the performance of the contract. The effectiveness was determined by relating the point value of risks, defined as the product of the effects and probability, covered by a given insurance

product, to the sum of the point value of all risks identified as significant from the contractor's point of view. The results of the effectiveness of selected insurance products are as follows:

- third-party liability insurance - 22/128 points,
- liability insurance of the shipowner - 25/128 points (37/128 points in the case of P&I insurance under club conditions),
- insurance of all construction risks, section I - 20/128 points,
- insurance of all construction risks, section II - 5/128 points,
- casco insurance of vessels - 50/128 points.

These results indicate that marine insurance, which includes liability of the shipowner and casco of vessels, covers the most risks, significant from the point of view of the contractor of the dredging works. As shown by the analysis of contractual requirements in relation to the expected insurance cover, carried out in chapter three, the terms and conditions of such insurance are not of interest to the contracting authority.

Civil liability insurance, which is the most frequently required insurance when carrying out dredging works, is an adequate tool in the face of the risk of an accident at work, and in the face of damages during underwater works consisting in the removal of hazardous materials from the seabed, which often, but not always, accompany the proper dredging works, within the given order. For the remaining risks related to the implementation of dredging works, this product is not applicable.

Contractor's All Risk insurance (section I) achieved the result of 22/128 in the assessment of effectiveness. The risks covered relate to damage to the contractor's equipment. In the case of dredging, this insurance does not fulfill its primary purpose, as it does not cover damage to the object of work. The requirement to have insurance in this area most often accompanies the performance contracts concluded on the basis of FIDIC contractual conditions. This creates an unnecessary cost for the policyholder which is reflected in the contract price. It is a bad market practice that should be counteracted at the stage of applying for a contract by informing the contracting authority about the scope of the required protection. It is then up to the contracting authority to decide on this matter. Experience shows, however, that this problem is being ignored in the rush of works related to the tendering procedure.

Section II of the insurance for all construction risks, including civil liability in tort for damage to third parties or to their property throughout the entire duration of the investment process, achieved the lowest effectiveness score of 5/128. Contrary to civil liability insurance,

this product does not cover damages related to accidents at work. It is only used when there is a risk of explosion of hazardous materials during their extraction and transport.

The insurance effectiveness index was defined as the ratio of the insurance value corresponding to the sum insured / guarantee sum to the cost of protection. For each of the risks, the maximum financial exposure of the insurance company may be limited by the sum insured, the guaranteed sum or by specific legal regulations limiting the liability of the shipowner. These limits were considered when assessing each of the insurance products analyzed. The efficiency indicator defined in this way shows how cost-effective an insurance product is in terms of providing protection for specific risks.

In the case of marine insurance, assessed as the most effective, and therefore providing protection for the widest group of risks related to contract performance, the effectiveness assessment is relatively high. The protection efficiency index is 220.03 for damages limited by the liability limit established on the basis of conventions on limitation of liability for maritime claims. It should be noted that this limit is set individually depending on the tonnage of a given vessel.

For construction insurance, where the sum insured in section I is determined on the basis of the full value of the contract work, and at the same time protection in the subject of the works is excluded, the effectiveness will be zero. Traces of effectiveness may be provided by additional clauses regarding insurance of equipment or machines not assigned to the unit (not included in the total casco insurance), damage to property belonging to the contracting authority, with a source other than the operation of the vessel or the costs of possible cleaning up of the remains of the damage. Due to the low-cost effectiveness of this insurance, resulting from its inadequacy to the risks related to the implementation of the contract for dredging works, it would be advisable to seek other forms of securing the interests of the parties. It should be noted that the cost of CAR insurance in the current market conditions varies from 0.6% to even 1% of the contract value, which is reflected in the contract price offered by an experienced contractor.

The presented arguments confirm the main thesis of the thesis that effective and efficient insurance of marine dredging works requires considering the specificity of the risk, both at the stage of drawing up contractual requirements and in the process of negotiating the terms of the insurance contract. The market practice in this area documented in this work indicates the need to take action to better protect the interests of the contracting parties.