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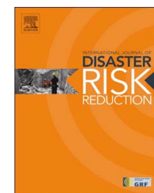

Exploring the institutional determinants of risk governance: A comparative approach across nations

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ABSTRACT

The ability of risk governance greatly influences the results when countries face risks. A country with improved risk governance can avoid or minimize disaster loss. This paper explores different institutional governance factors that affect risk governance across countries, and the results can guide the governments to improve their capabilities in the fight against risks. We classified the institutional governance traits of a country into four distinct dimensions. These dimensions are: democracy, economic freedom, government effectiveness, and corruption. We find that government effectiveness constitutes the leading effect on risk governance, whereas the control of corruption and economic freedom play a secondary supporting role. Bootstrap mediation analysis showed that economic freedom can help improve the performance of an economy, thereby indirectly enhancing the ability of risk governance. Although the effect of democracy plays a negative role, we should keep in mind that both centralized national control and democratic local institutions are necessary for successful risk governance, and an integrated risk management system with diverse risk strategies may be the optimal solution.

1. Introduction

Due to the increasing interconnectedness in today's globalized world, risks have become more difficult to manage, and disasters are more deadly and frequent. The number of reported natural disasters from 1900 to 2010 has quintupled [29]. When dealing with risks, reliable governance mechanisms have outstanding advantages that can provide credible forecasts and warnings before disasters occur, as well as timely emergency response measures after disasters. These mechanisms can help minimize or even to avoid the negative consequences of disasters. According to the empirical data of UNDP [61], although only 11% of the people that live in developing countries are exposed to natural hazards, developing countries suffer 53% of the total recorded deaths. Hence, policymakers and the public have become increasingly aware of constructing improved risk governance mechanisms to meet public expectations.

"Risk governance" was presented to help risk professionals establish a broader concept of risk management. The term first appeared in scientific articles in 2001 [34] and later in the European Commission's Science & Society action plan (2001). The concept of "risk governance" is rooted in diverse research fields such as, risk management, risk assessment, and policy analysis. Risk governance refers to the institutional structure and the policy process that instructs people to reduce, regulate or deal with risk problems [41]. Unlike traditional probability-based risk analysis, it emphasizes the way risks are addressed by institutions and individuals [26,52,53]. According to van Asselt and Renn [62], risk governance provides a normative and a conceptual framework to deal with complex and ambiguous risks, including a series of questions such as public trust and managers' risk perception.

The evaluation of risk governance denotes the public's perception and trust in the government's ability to deal with risks. Such evaluation assesses the quality of risk governance, which can show the standards of good risk governance and compel state managers and legislators to act accordingly. In addition, the evaluation of risk governance reflects the public's trust towards the government's risk regulation capabilities. Sufficient trust for the government by the public can promote smooth and harmonious policy implementation through social interaction lubrication [60] and largely reduce the uncertainty and skepticism of the public [27]. Consequently, the factors that influence the public's evaluation of a country's risk governance abilities generate interest. The institutional architecture of a country may be one of the most important factors, because substantial losses caused by disasters are often traced to flawed or erroneous policies or the lack of institutional capacity to

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deal with disasters [18,30]. However, little attention has been directed at risk governance research to the influence of institutional components. For example, Kahn [39] suggested that rich nations, democracies and nations with higher-quality institutions suffer less death from natural disaster. Peduzzi et al. [50] noted that human vulnerability is most closely linked with a country's development level and environmental quality.

Unlike previous research, this work aims to quantify the influence of a country's institutional characteristics on risk governance. We believe that a comparison between common institutional characteristics of different countries can be useful to describe reliable governance systems and help policymakers identify the advantages and disadvantages when dealing with risks. Political, economic, and social arrangements are the three most significant dimensions of institutional traits related to risk governance [1,57,59]. Thus, the main institutional characteristics within this work include four dimensions: (1) openness of economic policy; (2) degree of democracy; (3) government efficiency; and (4) degree of corruption. We chose these four governance indicators because each represents a dimension of institutional traits, and then we studied their influence on the public's evaluation of risk governance abilities across countries. To explain their function channels, mediating effect tests were used.

These results can provide policymakers and practitioners with an overview of the institutional influences on their country's risk governance systems and support them in improving their country's risk governance abilities. Before presenting the results, the theoretical background of our research is summarized.

2. Background

The concept of governance has recently gained interest from researchers across many fields, ranging from economics to political science ([24,52,63]; Verweij and Thompson, 2006). This broad concept includes the decision-making process, institutional design, collaboration of multiple actors, and legislative procedure [10,52]. Given the wide spectrum of available definitions, developing a good summary description of governance is difficult. Hence, analytical lenses should be focused on specific aspects of governance. Relevant studies mainly considered governance as the process of making decisions, as the compromise between different stakeholders, or as the ability to deal with institutional constraints [11,14,38,40]. Several methodologies were developed to measure specific aspects of governance quality, ranging from questionnaire surveys to desk studies [13].

Governance quality is particularly important when dealing with global risks, as it covers almost every phase of disaster management from risk assessment and early warnings to risk regulation, communication, and risk response (see [8,25,37,63]). However, to our knowledge, few researchers have focused on the influence of governance traits on risk governance ability. For instance, Kahn [39] used the dataset on annual deaths from natural disasters to test hypotheses concerning natural-disaster mitigation. He suggested that rich nations, democracies, and nations with high quality institutions suffered fewer deaths from natural disasters. Peduzzi et al. [50] used the Disaster Risk Index to identify countries that are most exposed to natural hazards. These authors suggested that human vulnerability is primarily linked with a country's development level and environmental quality. Carreno et al. [20] developed the Risk Management Index to measure risk management performance and effectiveness, which can reflect the development, organization, capacity, and institutional actions taken to reduce vulnerability and losses in a given area.

Other researchers highlight microscopic governance characteristics. Walker et al. [63] proposed a risk governance profiling framework to establish the key characteristics in a particular risk governance setting. They summarized eight new key governance characteristics in risk governance, including the governance processes, broad involvement and collaboration of multiple actors, new forms of authority and control, and changing distributions of responsibilities. Scolobig et al. [56] identified three sets of governance characteristics and analyzed technical and institutional capacities by providing a comparative evaluation of governance systems between Italy and France. Their research provided an overview of the strengths and weaknesses of the governance systems when dealing with risks.

Previous studies emphasized microscopic governance characteristics with a theoretical framework, such as the decision-making process, collaboration and communication of multiple actors, and the allocation of specific responsibilities. However, we believe the institutional architecture of a country may also be one of the most vital determinants that influence risk governance, because substantial losses from disasters are often traced to unsuitable policies or to the lack of institutional capacity when dealing with disasters [18,30]. As an example, the main failures during Hurricane Katrina (which hit the US in August of 2005) were attributed to the lack of effective governance [66]. Additionally, the nuclear accident at the Fukushima Daiichi power plant in Japan was also ascribed to Japan's organizational and regulatory systems [46].

According to macro-institutional theories, the choice of institutional designs results in actual consequences for government performance, and institutional arrangements constitute a country's governance structure of public policymaking (e.g., [42]). Rapidly growing quantitative governance indicators can comprehensively reflect a country's institutional traits. Such indicators evaluate almost every aspect of governmental policy and the characteristics of political institutions. For example, the Worldwide Governance Indicators (WGI) released by the World Bank are broadly used as independent variables in empirical studies [5,22,32,47]. A useful framework for classifying these governance indicators was proposed by Buduru and Pal [16]. They broke down 174 of the most prominent governance indicators into four categories according to the content targeted for measurement, which included economic institutions, democracy, political institutions and corruption.

Based on previous studies and macro-institutional theories, we classified the institutional traits that are most related to risk governance into four dimensions: (1) openness of economic policy; (2) degree of democracy; (3) government efficiency; and (4) degree of corruption. We quantified the influence of each dimension on risk governance across countries. Unlike the microscopic views in previous studies, the influence of macroscopic institutional traits across countries is emphasized in this research. Also, most existing research has focused on specific risks in just several key regions (e.g., [6,56,63]). To complement the extant literature, the current work extends the scope of analysis to the general global risks across 139 countries. Additional details about our methods are presented in the following sections.

3. Methods

3.1. Theoretical framework

In the field of risk governance, a country's institutions can be defined as entities that design rules and regulations that determine a country's economic, political, and social characteristics [48]. The institutional environment is the set of fundamental economic, political, and social regulations established and is the basis for life and production [23]. An initial overview of a country's governance structure should primarily entail economic and political institutions, as well as factors related to the capacity and relationships of relevant actors [1]. Economic policies have major implications for poverty reduction, economic growth, and improvements in the quality of life. Moreover, the quality of political institutions has vital consequences for the formation and implementation of risk management programs. Also, social relationships, such as participation and transparency, deeply influence the decision-making process and practical risk reduction [61]. Therefore, political institutions, economic institutions, and social

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