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Exploratory Analysis of the Relationship Between Social Capital Variables and Predictors of OECD Country Risk Rating

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EXPLORATORY ANALYSIS OF THE RELATIONSHIP BETWEEN SOCIAL CAPITAL VARIABLES AND PREDICTORS OF OECD COUNTRY RISK RATING

ABSTRACT

In this paper, we relate the Social Capital (SC) factors identified in the study "Dimensiones del Capital Social: Análisis de Componentes Principales Sobre la Encuesta Mundial de Valores WVS" (Ramírez-Muñoz et al., 2023) with a set of predictor variables of Country Risk (CR). Therefore, our study concerning economic theory is hybrid. For CS, risk is associated with the concept of confidence. Our study analyzes data from 40 countries between 2017 and 2022, which do not include high-income countries (GNI per capita according to the WB). The selection of this sample is limited by the availability of information, which is the intersection of simultaneously available information on SC and CR variables. The exploratory research based on the bootstrap correlation matrix confirms much of the existing literature. It raises new horizons for scientific discussion and relevant aspects for Economic Policy agents.

Keywords: Social Capital, Country Risk, Development Economy, Multivariate Analysis, CR_OECD.

JEL Classification: C38, D81, D85, F62, O11, Z13

RESUMEN

En este trabajo relacionamos los factores de Capital Social (SC) identificados en el estudio "Dimensiones del Capital Social: Análisis de Componentes Principales Sobre la Encuesta Mundial de Valores WVS" (Ramírez-Muñoz et al., 2023) con un conjunto de predictores del Riesgo del país (CR). Por tanto, nuestro estudio sobre la teoría económica es híbrido. Para CS, el riesgo está asociado con el concepto de confianza. Nuestro estudio analiza datos de 40 países entre 2017 y 2022, que no incluyen países de altos ingresos (INB per cápita según el BM). La selección de esta muestra está limitada por la disponibilidad de información, que es la intersección de información disponible simultáneamente sobre variables SC y CR. La investigación exploratoria basada en la matriz de correlación bootstrap confirma gran parte de la literatura existente. Plantea nuevos horizontes para la discusión científica y aspectos relevantes para los agentes de Política Económica.

Palabras clave: Capital Social, Riesgo del país, Economía del Desarrollo, Análisis Multivariado, CR_OCDE.

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1. INTRODUCTION

1.1 Background

When considering investing or conducting business in a specific country, conducting a comprehensive country risk analysis is essential. The assessment considers factors such as political stability, economic conditions, legal framework, social norms, and cultural influences. To facilitate this analysis, organizations like the OECD (Organisation for Economic Cooperation and Development) and COFACE (*Compagnie Française d'Assurance pour le Commerce Extérieur*) offer valuable insights and tools that assist businesses in gaining a deeper understanding of country-specific risks. Country risk encompasses multidimensional factors that collectively shape a nation's business environment and dictate its investment potential. Among these considerations, Social Capital – the networks, relationships, and traditions that bind a society – plays a significant role in a nation's stability, resilience, and potential for development.

Understanding a nation's Social Capital provides insights into its stability and resilience. High Social Capital often means a strong sense of communal responsibility, cooperative behavior, and mutual trust within society. These factors can contribute to a more stable and predictable investment environment. Further, nations with high Social Capital generally demonstrate greater resilience in the face of economic or political challenges, with strong communities able to mobilize resources, share information, and support one another during tough times.

Several studies have examined the relationship between social trust, civic norms, and networking on economic and government performance (Bjørnskov, 2006, 2012; Dearmon & Grier, 2009; Knack & Keefer, 1997; LaPorta et al., 1997; Schmidt, 2003; Zak & Knack, 2001). Additionally, Social Capital plays a significant role in a nation's stability, business environment, and investment potential (Grootaert et al., 2001; Patulny, 2003; Portes & Landolt, 2000). Societies with strong social networks and cooperative norms may find it easier to implement development projects, foster innovation, and drive economic growth (Commission, 2003; Fukuyama, 2001). Therefore, a critical examination of Social Capital provides valuable insights into a country's future trajectory and enhances risk assessments by considering socio-cultural differences.

Leavy (1984) and Lehmann(1999) provide frameworks for assessing country risk, particularly addressing the role of socio-cultural differences. Country risk assessments typically focus more on downside than upside risks (Leavy, 1984). Downside risks involve potential adverse outcomes or losses. They are important to consider for contingency planning, implementing

appropriate risk mitigation measures, and evaluating whether the possible loss is acceptable concerning the expected benefits of the investment (Ben Ameur et al., 2020; Damodaran, 2022; Di Gregorio, 2005; Lehrbass, 1999). Examples of downside risks in country risk analysis include political instability, economic downturns, sudden regulatory changes, resistance to change or innovate, limited social networks, and weak civic engagement.

On the other hand, upside risks refer to opportunities that may result in better-than-expected outcomes or gains (Hillson, 2002; Leavy, 1984). Identifying and quantifying these positive deviations can enable investors to capitalize on growth prospects and maximize investment returns. Upside risks may arise from favorable market changes, improvements in country conditions such as economic liberalization or innovation-friendly policies, positive demographic trends, trust in institutions, trust and cooperation among citizens, and community resilience (Shostya & Banai, 2017).

Integrating the study of Social Capital with country risks allows for a more holistic understanding of the potential investment and broader socio-political-economic factors. By considering both, an investor can more accurately evaluate the total risk profile and potential returns of an investment in a particular country.

1.2 Research Purpose

Several studies have supported the notion that country risk is part of Social Capital variables. The relationship between economic outcomes and Social Capital indicators, such as trust in institutions and networking, is profound. Research conducted by Cosset (1991) and Hoti & McAleer (2004) has demonstrated that both economic and political factors significantly impact country risk assessments. Christoforou (2011), Pons & Navarro (2010), Turkina & Thi Thanh Thai (2013), and Cartwright & Singh (2013) have all emphasized the importance of Social Capital, particularly trust and networks, in influencing both individual engagement within groups and broader political engagement, immigrant entrepreneurship, and broader economic development.

Grafton & Knowles (2004) also provide an empirical test of the relationships between national measures of Social Capital and various indicators of national environmental performance. Their results revealed that the presence of social networks and trust between individuals is a crucial factor in understanding national environmental performance. Additionally, Lee & Law (2017) conducted a cross-country analysis to explore the roles of formal institutions and Social Capital in innovation activities, highlighting the importance of social connections as a determinant of innovation across different countries. Furthermore, Muriisa & Jamil (2011) discuss the challenges of addressing HIV/AIDS in Uganda and NGOs' role in Social

Capital generation, emphasizing the impact of social connections on addressing health challenges within a specific country context.

The primary aim of this study is to investigate the degree to which Social Capital variables, such as citizens' confidence, trust, and networking, affect the level of trust in a country. These Social Capital variables may also influence the country's risk indicators of OECD rating.

The second goal is to help decision-makers understand how social factors affect certain risks. At a national level, policymakers can use this study to identify the key influencers of country risk, social trust, civic norms, and networking. International businesses and agencies can use the results of this study to plan their offshoring/reshoring strategies by considering the impact of Social Capital on different aspects related to country risks, such as the business environment and political risks.

The paper is structured as follows: Section 2 briefly overviews the pertinent literature. Section 3 lays out the methodology we used for our research. In Section 4, we present our findings, and in Section 5, we provide discussions and conclusions.

2. Literature Review Background

2.1. Country Risk Variables

The examination of country risk assessment entails various aspects for a more comprehensive understanding of the potential risks and challenges associated with investing or conducting business in a specific country. Assessing country risk involves evaluating numerous economic, financial, and socio-political stability factors. While different sources or methodologies may consider slightly different dimensions (M. Bouchet et al., 2018; M. H. Bouchet et al., 2003), some commonly assessed aspects include economic and demographic conditions, political climate, legal and regulatory frameworks, financial systems, social dynamics and cultural considerations, operational factors, environmental circumstances, safeguards against technological threats and cybersecurity risks are taken into account (M. Bouchet et al., 2018).

Financial risk encompasses a range of factors that can impact the accessibility of government loans, both domestically and internationally, as well as potential returns on equity in the future (Harvey, 2004; Howell, 2013; C.-C. Lee et al., 2019), while economic risk reflects assessments by investors on a country's fundamentals such as GDP per capita, inflation and other macroeconomic measures (Cosset & Roy, 1991; Erb et al., 1996). Political risk involves the stability and predictability of a country's political system,

which can impact investment decisions and economic growth (Cosset & Roy, 1991; Cuervo-Cazurra et al., 2023; Hoti & McAleer, 2004; Howell, 2013; Khan & Akbar, 2013). Market-level risks are associated with the general market mood toward risk, which is often more volatile in emerging countries than in industrialized ones (Lessard, 1996). These factors also encompass social and cultural dynamics that can impact consumer behavior, market demand, and the broader business environment, such as social cohesion and stability, cultural influences on business operations, demographic trends, and social infrastructure like education, gender empowerment, humane orientation, religion, corruption and healthcare (Alon & Spitzer, 2003; Shostya & Banai, 2017).

Country risk assessment is a multidimensional process that involves evaluating various factors, making it a challenging task (Arora & Kumar, 2022; Kappes et al., 2012). Additionally, the existence of several major country risk rating agencies underscores the importance of country ratings in assessing risk, with agencies such as the Economist Intelligence Unit, Euromoney, Institutional Investor, International Country Risk Guide, Moody's, Political Risk Services, the World Bank, Transparency International, OECD and Standard and Poor's playing significant roles in this domain (Hoti & McAleer, 2004).

Moreover, these assessments consider various methodological approaches, including quantitative and non-quantitative criteria (Cosset et al., 1992; Nath, 2008; Zopounidis et al., 1998). The subjectivity of these assessments is influenced by socio-cultural differences, which can lead to varying interpretations and perceptions (Leavy, 1984). Various approaches are commonly employed, including expert perception and evaluation, scoring models that combine index data from different variables, the analytic hierarchy process which assesses the relative importance of relevant variables based on judgmental data, simulation surveys that generate risk perception data through scenario-based analysis, as well as statistical techniques such as regression and factor analysis (M. H. Bouchet et al., 2003, 2018; Levy & Yoon, 1995, 2001; Qazi & Khan, 2021).

Numerous studies have delved into the multifaceted assessment of country risk by drawing upon various theoretical frameworks. These include economic theories that examine factors such as fiscal and monetary policies, inflation rates, and exchange rates to gain insights into economic risks or incorporate the impact of economic development and industrialization. Additionally, political theories explore the effectiveness of a country's political institutions and their impact on its profile while examining the relationship between political and economic systems and geopolitical factors. Socio-cultural theories offer valuable perspectives for evaluating and quantifying country risk by considering social concerns and the evolving attitudes within a population. Furthermore, some studies integrate disaster risk analysis into country risk assessment (Djalante et al., 2011); this

approach is necessary due to the significant gap that exists when evaluating natural hazards and their potential impact.

Deceanu et al. (2010) highlight the need to expand our understanding of country risk beyond traditional political, economic, financial, and social factors. They suggest integrating additional criteria like technological or environmental dimensions into estimating, evaluating, and forecasting country risk (Brown et al., 2015; Hoti & McAleer, 2004). This comprehensive approach reflects the evolving nature of risk assessment methodologies in a dynamic global context (Borio & Packer, 2004).

2.2 Micro-Meso-Macro Analysis

Our interdisciplinary research integrates insights from sociology, economics, political science, and other relevant fields necessary to understand the complexity in the context of Social Capital and country risk analysis. It allows for a comprehensive understanding of the multifaceted nature of societal phenomena and the interconnectedness of various factors at different levels of analysis. A range of studies underscores the importance of interdisciplinary research in understanding the complex interplay between micro, meso, and macro levels of analysis. Serpa and Ferreira (2019) and Jaspal et al. (2016) both emphasize the need for a multilevel approach, with the latter proposing a theoretical synthesis to integrate these levels.

Integrating insights from sociology provides a deeper understanding of individual and group behavior within societal structures, while economics offers insights into the allocation of resources and decision-making processes. Political science contributes to understanding governance structures, power dynamics, and policy implications, while other relevant fields may provide additional perspectives and methodologies to enrich the analysis. For instance, Van Wijk et al. (2019), Finkel and Straus (2012), and Bevan (1997) further stress the importance of integrating insights from different fields, such as institutional theory and sociology, to understand social innovation and economic functioning.

Also, Roberts (2020) highlights the practical implications of these levels in public administration, recognizing it is possible to demonstrate linkages between macro, meso, and micro levels. At the macro level, national leaders formulate a comprehensive strategy to prioritize national interests and determine the overall structure of the state. This sets the foundation for public administration at the meso level, where institutions are developed or managed to implement these strategies effectively. These meso-level institutions play a critical role in translating broad national strategy into practical actions. Macro-level strategies significantly impact the relationship between those in power and those who are governed. This is achieved through the categorization of individuals as subjects or citizens, which can influence governance dynamics at a micro level. These macro-level

strategies evolve over time and have consequences for both meso- and micro-level agendas. Furthermore, experiences at lower levels contribute to refining and adapting strategies at higher levels, emphasizing the interconnectedness between different levels of analysis in public administration research.

Balcells and Justino (2014) also support the need for interdisciplinary research in their discussion on civil wars and political violence. They highlight the importance of connecting micro and macro levels of analysis to deepen our understanding in this area. It raises concerns about the limitations of solely focusing on one level and the difficulties in integrating different levels. The authors ultimately advocate for a fresh research agenda that incorporates local social, economic, and political dynamics alongside broader conflict processes at the macro level to achieve a holistic understanding of societal issues.

Social Capital can significantly shape individual decision-making processes and risk perception at the micro-level, influencing how people navigate their choices. On the meso level, Social Capital has the potential to significantly impact the functioning of communities and industries, serving as a catalyst for collaboration and cooperation within these broader contexts. Meanwhile, on a macro-level scale, Social Capital becomes even more significant as it shapes entire nations' political stability, economic development prospects, and overall resilience towards external risks.

Research studies like Sobel (2002) have raised thought-provoking questions concerning the causal nature of Social Capital's effects across these different levels. Sobel argues that while Social Capital is often associated with successful institutions or outcomes, it could be merely a result rather than a cause. This perspective suggests that positive outcomes in individual actions generate higher levels of trust and connectedness at the micro-level, challenging the assumption that preexisting Social Capital directs individual actions and decisions. At the meso level, such as community or industry, successful institutions could create better social networks and relations rather than being directly influenced by preexisting high levels of Social Capital. This perspective challenges the conventional belief that Social Capital is a key driver of community success and industry growth.

Portes (1998) expressed skepticism about universally positive aspects attributed to Social Capital. He emphasized certain negative consequences at the meso level related to strong intra-group ties, such as fostering insularity or exclusionary dynamics among groups. These dynamics may limit interactions within communities or industries, restricting the exchange of ideas and undermining communal harmony or industry competitiveness.

Regarding macro-level impacts, Fine and Green (2000) challenge the notion that a nation's overall Social Capital directly correlates with its political

stability or economic development. They contend that factors such as governance quality or economic policies may exert a more significant influence. However, it is important to note that their work also emphasizes the need to examine meso-level and micro-level relationships to understand how individual and institutional behaviors contribute to the creation of Social Capital at various societal levels.

Country risk analysis is dynamic and interconnected across these levels. Changes in the macro-level political environment can affect regulatory conditions (meso) and, consequently, impact individual businesses (micro). Economic conditions at the macro level can influence industry-specific risks (meso) and individual investment decisions (micro). Gaventa (2006) suggests that grassroots activism at the micro level – originating from individual businesses or citizens – can bring about changes to meso-level structures like regulations. These changes at the meso level can subsequently impact the macro-level political environment.

The study by Adomako & Danso (2014) provides insights into how weak and underdeveloped regulatory environments can negatively affect the performance of firms. This supports the argument that changes at the meso level (regulations) can directly impact the macro-level political environment, contrary to the traditional view that regulations merely react to macro-level changes. Additionally, the study by Chang et al. (2018) examines political risk factors in international construction projects, shedding light on the intricate relationship between regulatory environments and political risks, further supporting the argument that meso-level changes can influence the macro-level political environment.

2.3. Social Capital Variables

Social Capital refers to the value of social networks and the norms of reciprocity and trustworthiness that arise from these networks. It is a concept widely studied in social sciences, including sociology, economics, and political science. While there is no universal definition of Social Capital, it is generally understood as the resources and benefits individuals and groups derive from their social connections and networks.

According to Putnam et al. (1993), Social Capital refers to "the features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit." This definition emphasizes the importance of social networks and the norms of reciprocity and trust that enable individuals to work together for common goals. Social Capital can take different forms, such as bridging, bonding, and linking Social Capital (Muringani et al., 2021; Putnam, 2000; Putnam et al., 1993; Sabatini, 2008). Bridging Social Capital involves connections between people who are diverse in terms of socioeconomic status or ethnicity while bonding Social Capital is formed among those who share similar characteristics. Linking

Social Capital refers to connections between individuals from different societal hierarchies, like citizens and government officials.

Coleman (1988) argues that Social Capital is a valuable resource because it allows individuals and groups to achieve goals that would be difficult or impossible to achieve alone. For example, social networks can facilitate access to information, resources, and opportunities. Social Capital can also be used to overcome collective action problems, such as the tragedy of the commons. By promoting trust and cooperation, Social Capital can encourage individuals to work together to achieve common goals.

In recent years, there has been growing recognition of the significant impact that Social Capital can have on various outcomes such as economic growth, health, and overall wellbeing. Researchers like Woolcock and Narayan (2000) assert that Social Capital plays a crucial role in promoting economic development by facilitating the exchange of information and resources. It also helps to decrease transaction costs while enhancing market efficiency. The influence of Social Capital extends beyond economics. In addition, Berkman et al. (2000) reveal a positive correlation between strong social ties and improved health outcomes, including lower mortality rates and reduced obesity prevalence. These findings underscore the essential role of fostering community relationships in achieving favorable results across multiple domains.

Social Capital can sometimes perpetuate inequalities and discrimination by favoring particular groups over others regarding access to networks and resources (Portes, 1998). Additionally, the existence of strong social connections can be utilized for negative purposes such as organized crime or political corruption (Fukuyama, 1995; Portes & Sensenbrenner, 1993; Rubio, 1997). Therefore, a thorough understanding of Social Capital necessitates an examination of both its benefits and drawbacks.

2.3.1. Types and Components of Social Capital

Another way of categorizing Social Capital is by its form (Newton & Norris, 2000). Lin (2001b) identified three components of Social Capital: structural, cognitive, and relational. Structural Social Capital refers to the resources and opportunities embedded in social networks, such as access to information or job referrals. Social Capital refers to shared community norms, values, and expectations that guide social interactions and behavior (Allport, 1961; Cattell, 1965; Erikson, 1950; Glanville & Paxton, 2007; Rosenberg, 1956; E. Uslaner, 2002). Relational Social Capital refers to the quality and strength of ties between individuals or groups, such as the level of trust, reciprocity, and obligation between them (Coleman, 1990; Mishler & Rose, 1997; Newton, 1997; Ostrom, 1990; Rose et al., 1997).

The components of Social Capital are interrelated and mutually reinforcing. For instance, the cognitive aspects of these networks can influence the development of structural and relational elements by fostering shared goals and expectations, laying the foundation for trust and cooperation (Lin, 2001b). The quality of relational Social Capital can also influence the acquisition of structural elements, such as access to job opportunities or financial resources (Bourdieu, 1986). The specific components within these networks may vary depending on the context in which they operate.

2.3.2. The Dual Influence of Social Capital

Empirical evidence suggests that Social Capital is positively correlated with economic development. A study by Knack and Keefer (1997) found that countries with high levels of Social Capital had higher economic growth. Similarly, a study by Putnam et al. (1993) found that regions in Italy with high levels of community ties had higher levels of economic development by facilitating the exchange of information, reducing transaction costs, and enhancing the efficiency of markets. However, it can have negative effects, such as rent-seeking, self-interest, and less innovation.

Social Capital can affect economic development: Directly, Social Capital can lead to greater investment, better access to credit, and higher rates of entrepreneurship (Guiso et al., 2004). Indirectly, the impact of these social connections can promote economic development by fostering a more conducive environment for innovation and creativity (Burt, 1992, 2004).

Social Capital has also been linked to a country's stability. Researchers have found that social fabric can play a significant role in reducing political and social instability. High levels of Social Capital can lead to better governance, more stable political systems, and less violence (Putnam et al., 1993). Countries with heightened social cohesion are more likely to have strong and stable institutions, lower levels of corruption, and greater civic engagement (Knack & Keefer, 1997).

In contrast, countries with low levels of Social Capital may experience greater political and social instability. Weak social networks and a lack of trust among citizens can lead to social conflict and political instability (Woolcock & Narayan, 2000). In such environments, it can be challenging to establish and maintain effective institutions and governance structures, which can hinder economic growth and development. Looking through the lens of Social Capital, individuals and organizations utilize their connections to access valuable resources, information, and support to attain their goals (Burt, 1992). Lin (2001a) argues that individuals leverage social relationships to influence public policy and promote their interests.

Some scholars argue that particular groups of people, organizations, and political elites hold excessive power and influence over society. C. Wright

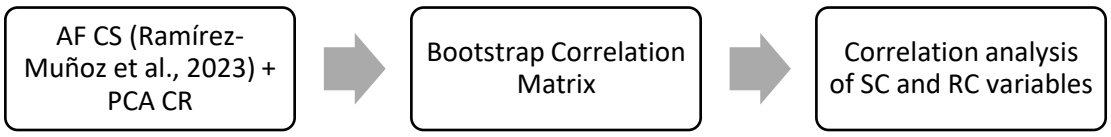
Mills (2000) considers that these groups formed a "power elite" controlling key institutions such as the government, military, and media. This concentration of power could result in an unequal distribution of resources and influence within society, which Mancur Olson (1982) believed could threaten democratic principles.

From this perspective, negative social networks, norms, and excessive trust may have detrimental impacts by enabling unequal and preferential treatment within the country's power structure. Such inequitable practices can pervade other aspects of social and economic activity, thus distorting fair competition and balance. When these negative aspects are prevalent in a society, they may obstruct the effective allocation of resources, mainly inhibiting productive collaboration and coordination among individuals and organizations. This lack of cooperative effort may further the differentiation of socioeconomic status among citizens and widen wealth gaps.

The misuse or abuse of Social Capital also disrupts the empowerment of citizens in decision-making processes. With certain groups receiving special treatment, power dynamics may skew, leading to imbalances in representation and influence among the population. However, it's important to note that concrete empirical evidence supporting the negative impacts of Social Capital is limited. More research is needed to substantiate these claims and broaden our understanding of how the adverse effects of Social Capital may manifest in different sociopolitical contexts and what measures could be employed to mitigate them.

3. METHODOLOGY

Illustration 1.
Methodological Proposal



3.1 Factor Analysis for the Social Capital variables

The factor scores by country for the Social Capital factors come from the study "Dimensions of Social Capital: Principal Component Analysis of the WVS World Values Survey" (Ramírez-Muñoz et al., 2023). The factor extraction was performed with maximum likelihood and Varimax rotation. This assumes that the model is valid for inference and that the mean scores obtained for the countries are adequate from the theory of measurement. It

also eliminates the problems of correlation between the predictor variables. The variables that did not participate in the extraction were added to the factors but were relevant for the Social Capital theory, distinguishing between linearly independent variables for the factors and dependent variables. Principal Component Analysis (PCA) represents a fundamental resource in exploring complex underlying structures in data sets. This statistical technique is characterized by its ability to simplify and reduce the dimensionality of sets of interrelated variables by obtaining principal components that are mutually uncorrelated. PCA seeks to identify variables capable of capturing the most outstanding amount of variability in the data based on the assumption that the original variables can be combined linearly to generate new independent components. These components are arranged in a particular order, according to their capacity to capture the inherent variability, so the first component has more information than the subsequent ones. In terms of its interpretation, PCA stands out for being a particularly intuitive dimension reduction, thanks to its geometric foundation, as proposed by Hotelling (1933).

3.2. Factor Analysis for Country Risk Predictable Variables

In our initial exploratory analysis, we deal with missing values by substituting them with appropriate values. We also simplify the variables using principal component analysis (Jolliffe, 2016), which helps identify the underlying structure of latent variables. As we have a limited sample size of 40 countries, we will use simple random sampling to increase the sample size and facilitate the convergence of the maximum likelihood algorithm for factor analysis.

Principal Component Analysis (PCA) represents a fundamental resource in exploring complex underlying structures in data sets. This statistical technique is characterized by its ability to simplify and reduce the dimensionality of sets of interrelated variables by obtaining principal components that are mutually uncorrelated. PCA seeks to identify variables capable of capturing the most significant amount of variability in the data based on the assumption that the original variables can be combined linearly to generate new independent components. These components are arranged in a particular order, according to their capacity to capture the inherent variability, so the first component has more information than the subsequent ones. In terms of its interpretation, PCA stands out as a particularly intuitive dimension reduction, thanks to its geometric foundation, as proposed by Hotelling (1933).

Maximum likelihood factor analysis (MLFA) with Varimax rotation is a statistical tool widely used in multivariate data research. The main objective of this methodology is to identify underlying structures or factors that can explain the joint variability present in the original variables. Its application focuses on dimensionality reduction and discovering latent patterns within a

set of observed variables. According to Hair et al. (2019) and Tabachnick & Fidell (2013), MLFA with varimax rotation can effectively analyze the interrelationships between variables and uncover the hidden structures that are not immediately apparent.

The technique is divided into two sequential stages, each with its respective objectives: Firstly, the MLFA assumes that the observed data originates from a combination of latent factors and an error term. This phase aims to estimate the model parameters that maximize the likelihood of the observed data, considering the presence of the latent factors and the associated errors. The main aim is to identify the underlying structure of the factors that best explain the observed data based on the probability of occurrence of such data (Bentler, 1990). This method maximizes the likelihood of the observed correlations by assuming that the factors are distributed generally across the population.

Secondly, a Varimax rotation is performed after extracting components from the data, as Kaiser (1958) suggested. It is generally observed that the components are correlated, particularly between the second and last components. The Varimax rotation technique is employed to simplify the factor structure and make it more interpretable. This technique adjusts the coordinates of the original factors to maximize the variance of factor loadings on one variable while minimizing the variance on the other. By doing so, each factor can focus on a specific dimension of variability, resulting in a more straightforward and transparent solution.

MLFA has several advantages over PCA. Firstly, MLFA is based on the maximum likelihood method, which is more robust and better suited to complex data. Secondly, it is more appropriate when the data follows normality and linearity, enabling probabilistic inference instead of scores based on an algebraic model. However, MLFA has certain drawbacks, including its complexity in both implementation and understanding compared to PCA. Furthermore, larger sample sizes are required to produce reliable results, particularly when multiple factors are involved. Despite its more realistic assumptions, it is sensitive to deviations from normality or linearity in the data.

Determining the appropriateness of a dimensionality reduction relies on an amalgam of criteria that allow the adequacy of the model to the data to be assessed (Watkins, 2018). Among the conventional criteria, the consideration of the value of the determinant of the correlation matrix, the Kaiser-Meyer-Olkin index (KMO) (Kaiser, 1970), and the application of Bartlett's test of sphericity (Fabrigar et al., 1999; Kaiser, 1974; Stevens, 1996) stand out. A peculiar interpretation of Kaiser's criterion is the interpretation of the scree plot that recommends selecting the number of factors that, in proportional terms, accumulate the greatest variance (Cattell, 1966). These elements are used to discern the relevance of the

reduction of dimensions and provide an objective evaluation of the model's fit to the data, thus contributing to informed decision-making in the factor analysis process.

The determinant of the correlation matrix is revealed as an indicator sensitive to multicollinearity among the observed variables. Values are considered appropriate if they are not 0, according to the guidelines proposed by Kaiser (1974), except values that are close to 1, which suggest the presence of linear independence between multiple variables. On the other hand, Bartlett's test of sphericity is crucial in evaluating whether variables in the population correlation matrix are correlated. A low value in this test would indicate that the conditions are suitable for dimensional reduction, as Bartlett (1950) established.

The selection of how many components to retain in the principal component analysis is influenced by the data's specific characteristics and the study's objectives, as highlighted in previous research (Costello & Osborne, 2005; Jolliffe, 2016). This process is inherently iterative and requires the application of multiple criteria supported by factor analysis expertise (Tabachnick & Fidell, 2013). Commonly employed criteria include: 1) the proportion of variance explained, which measures how much of the total variability can be explained by the principal components without establishing a strict rule, although generally at least 60% is considered, and the contribution of each component is assessed as they are extracted, giving preference to those that explain a more significant proportion of variance with as few components as possible (Cattell, 1966; Horn, 1965) 2) the Kaiser-Guttman criterion (Yeomans & Golder, 1982), which proposes to retain only the components with eigenvalues greater than 1, which indicate the amount of variability explained by each component and help to evaluate its relevance; 3) the theoretical interpretation of the components, which means that they should have conceptual meaning, and their inclusion should be questioned if they lack interpretability (Arabie, 1991); and 4) the loading structure in the rotated component matrix, where components are expected to be composed of highly correlated variables, while weakly correlated variables should have low loadings, as this structure is essential for interpretation (Costello & Osborne, 2005). Choosing how many components to retain is a critical process in principal component analysis. It must be based on a careful evaluation that considers these multiple criteria.

3.3. Bootstrap on the Correlation Matrix

A small sample size raises several issues in assessing the significance of a linear model (Greene, 2017; Hill et al., 2007; Moore et al., 2018):

One of the challenges in estimating parameters for a linear model is the instability of the coefficient estimates, especially in small sample sizes. These estimates can be highly sensitive to even minor variations in the training

data, making it difficult to determine whether the parameters are statistically significant or simply a result of random fluctuations in the data. This can lead to uncertainty in the accuracy of the estimated parameters, which can be problematic in data analysis and decision-making processes.

When dealing with a small sample size, the estimates of linear model coefficients may not be reliable due to instability in parameter estimation. This means slight variations in the training data can significantly affect the estimates, making it difficult to determine if the estimated parameters are statistically significant or simply the result of random chance. Consequently, it is challenging to determine the accuracy of the estimates.

One of the challenges of working with small sample sizes is that the estimates can have low precision. This is due to the high variance in the data, which reduces the accuracy of the model coefficients. As a result, it can be challenging to identify the true relationships between independent and dependent variables. The small sample size makes it hard to assess model generalizability and limits accurate predictions.

One strategy to address these problems is using the Bootstrap method (Chernick et al., 2011; Davison & Hinkley, 1997; James et al., 2000). Bootstrap is a resampling technique that involves the generation of multiple data samples from the original sample. Each bootstrap sample is created by selecting observations from the original sample with replacement, which means that some observations may be repeated in multiple samples while others may be excluded.

To correctly estimate the correlations of Social Capital and country risk variables, we resort to Bootstrap for all these properties to estimate the population value of the correlation coefficients.

4. RESULTS

4.1 Data

For this study, we have compiled data for 40 countries.

We are using the mean values of factor scores (noted by F* and FC*) calculated by countries from the study "Dimensiones del Capital Social: Análisis de Componentes Principales Sobre la Encuesta Mundial de Valores WVS" (Ramírez-Muñoz et al., 2023). The original research offered values of the distribution of Social Capital variables referring to citizens, not countries. This methodology of using mean values has been used in other studies for the factorial reduction of values in Europe, with many variables coinciding with social capital variables (Rabadán Pérez, 2018). The rest of the variables

to predicate the Country Risk Ratio are available in the annexes (Section 1) and proceed from multiple sources like the World Bank, World Value Survey and others.

Due to the difficulty in finding cross-section data linking country risk according to the OECD and the Social Capital study (Ramírez-Muñoz et al., 2023), our analysis lacks a historical approach and does not follow a homogeneous behavior of countries according to economic theory. In other words, our study population focuses on the relationship between Social Capital variables and predictors of country risk, disregarding the influence of time and geographic location, as well as their consequences in the context of development economics and other disciplines of economic theory.

Hence, our investigation is exploratory and non-confirmatory, designed as a valuable instrument for identifying relationships that can benefit researchers in their future studies.

4.1.1. Missing Values Analysis

The first step is to identify the missing data mechanism and then replace any missing values using the most appropriate method. Any variable that has more than 21% missing data is discarded. In case of missing values due to Missing Completely at Random (MCAR), the EM algorithm replaces missing values for 19 variables. For non-MCAR values, regression is used to estimate missing values for 48 variables (Annex Section II). All these calculations were performed using R (R Core Team, 2023; Tierney & Cook, 2023; Wickham et al., 2023). The replacement of missing values using the EM algorithm and regression was conducted with SPSS 29 (IBM Corp., 2021).

4.2 MLFA on Country Risk Predictor Variables

A random sampling of size 1000 is performed on the countries with missing values substitution.

The Factor Analysis is validated with:

1. $[R] = 1{,}077E-16$. The determinant of the correlation matrix is close to zero but allows for matrix inversion.
2. $KMO = 0{,}769$. The set of variables is adequate for dimension reduction. The MSAs are mostly above 0.7, which also supports the quality of the Factor Analysis.
3. Bartlett's test: $P_{value} < 0{,}001$. We reject the hypothesis that the correlation matrix is equal to the identity matrix in the population.

We selected 4 factors that verify the Kaiser criterion, the percentage of total variance explained, and the principle of interpretability.

Table 1 shows the ability of the factors to explain the variance of the variables involved in the extraction. Note that after Varimax rotation, the explanatory power of the first and the second factors are close to 25%. Likewise, factors 3 and 4 have an explanatory capacity of around 11%. The percentage of total variance explained is higher than the generally accepted criterion of 60% by 78.42%.

Table 1

Total Variance Explained for FA CR Predictors

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11,101	44,403	44,403	8,863	35,450	35,450	6,352	25,407	25,407
2	3,740	14,961	59,364	4,710	18,840	54,291	6,311	25,245	50,652
3	3,045	12,180	71,544	2,852	11,409	65,700	3,074	12,295	62,947
4	1,718	6,871	78,415	1,995	7,982	73,681	2,684	10,734	73,681

Source: Own elaboration (SPSS 29)

Factors are interpreted in the rotated factor matrix (see Table 2). A variable is assigned to a factor when it is saturated by it, meaning it has the highest factor loading compared to other factors. The factor is named according to the latent variable inferred from the combined behavior of these saturated variables.

Table 2

Rotated Factor Matrix FA CR Predictors

Factor	Variable	F1	F2	F3	F4
F1	FCT2.EmigrationPotential	-0,934	-0,075	-0,107	0,008
	AgricultureforestryandfishingvalueaddedofGDP	-0,802	-0,281	-0,06	-0,106
	Mortalityrateunder5per1000livebirths	-0,794	-0,226	0,039	-0,019
	homiciderateHomiciderateper100000peopleUNDP20122018	0,759	0,32	0,114	0,244
	EaseofdoingbusinessrankingDB1721	0,742	0,335	0,016	0,207
	Accesstoelectricityofpopulation	0,684	0,227	0,026	-0,057
	GDPpercap2GDPpercapitaPPPconstant2017international$	0,675	0,517	0,167	0,337
	CDAAdjustedemissionsgrowthrateforcarbondioxide	0,672	0,217	0,09	0,086
	Populationgrowthannual	-0,667	-0,021	-0,002	-0,074
F2	PRRatingPoliticalRightsRating	-0,087	-0,958	0,099	0,052
	VoiceandAccountability	0,319	0,946	0	0,045
	FCT1.DemocraticFreedom	-0,027	0,864	-0,136	0,356
	P3HumanRights	-0,446	-0,809	0,118	-0,051
	RuleofLaw	0,391	0,76	0,008	0,34
	C2FactionalizedElites	-0,407	-0,723	-0,071	-0,27
	C3GroupGrievance	-0,423	-0,692	0,059	-0,131
	ControlofCorruption	0,377	0,676	0,136	0,327
F3	MethaneemissionsktofCO2equivalent	0,089	-0,094	0,919	0,068
	Forestareasq.km	0,243	0,091	0,868	0,077
	NitrousoxideemissionsthousandmetrictonsofCO2equivalent	-0,148	0,103	0,803	0,125
	Agriculturallandsq. km	0,107	-0,204	0,656	-0,011
F4	Patentapplicationsresidents	0,089	0,286	-0,127	0,801
	Scientificandtechnicaljournalarticles	0,264	0,248	0,321	0,758
	HightechnologyexportscurrentUS$	0,324	0,349	0,025	0,653
	GHNProjectedGHGEmissionsin2050	0,163	0,114	-0,383	-0,569

Source: own elaboration (SPSS 29)

We propose the following names for these factors:

CRF1. Country Population Development: This factor explains how developed countries are from a population perspective. Higher values in this factor indicate more developed societies. As society progresses in development, public services improve, per capita income increases, and it becomes easier to do business. Population growth tends to be lower in such societies.

In comparison, societies with lower values for this factor have relatively higher murder rates and rely more heavily on the primary sector of the economy. They also tend to have a higher propensity for emigration.

CRF2. Country Democratic Development: This factor measures the level of development related to democratic quality, corruption control, and the defense of human rights. As this factor increases, it reduces the influence of elites and diminishes the separation among social classes. It signifies an improvement in the freedom of expression, association, and the citizens' ability to choose their leaders. Additionally, it leads to enhanced freedom of the press. This factor encapsulates the progress of a society towards democratic ideals, promoting not only political liberties but also social equality, transparency, and protection of fundamental human rights.

CRF3. Country Environmental Development: This factor indicates the extent of development in the primary sector and its environmental impact. It evaluates the effect of agricultural and forestry activities, including methane emissions from farm animals. As the value of this factor increases, it indicates a larger amount of agricultural and forested land available in the country. This factor highlights the important relationship between a country's environmental practices, especially in the primary sector, and its overall developmental stance. It emphasizes the need for sustainable land use and environmental conservation for balanced growth.

CRF4. Country R&D Development: This factor shows a country's progress towards reducing greenhouse gas (GHG) emissions by investing in research and development (R&D). This factor increases as the country issues more patents, indicating a thriving environment for innovation and technological advancement. Additionally, the country's technological exports positively impact this factor, highlighting the significance of technological advancements in a nation's developmental landscape. This factor emphasizes the importance of promoting a culture of innovation, research, and environmental responsibility as crucial components of a country's progress.

In addition to the factors, we incorporate variables from the rest of the survey that are approximately linearly independent. This is done to capture the variability in the data of country risk predictor variables.

4.3 Matrix of Correlations Estimated by Bootstrap

To calculate the Bootstrap of the correlation matrix, we utilized SPSS 29. (IBM Corp., 2021) and conducted 1,000 resamples. By established literature guidelines, we have presented the correlations between the Social Capital variables and the various categories of country risk predictor variables in the following tables.

We will only comment on the correlations greater than 0.3 in absolute value, equivalent to a coefficient of determination greater than 0.09. The variable’s names are in the format used by R software.

4.3.1 Relationship Between SC-CR Economical Predictors

In table 3:

- The Country Population Development (CRF1) is highly correlated to the Social Capital variables, increasing with Tolerance of Violence Towards Institutions (F2), Association Activity (F3), and Social Trust (F7) and decreasing with Tolerance of Sexual Taboos and Right to Life (F4), Religiosity (F9), Trust in Immigration (F11) and Mass Media Flow (F17).

- Average annual inflation is negatively correlated to Local Rootedness (F14), Social Trust (F7), and Wellbeing (F15).

- Average annual inflation is negatively correlated to Local Rootedness (F14), Social Trust (F7), and Wellbeing (F15).

- The budget balance as a percentage of GDP negatively correlates to Political and Social Mobilization (F1) and Social Responsibility (F12). At the same time, it is positively correlated to Social Trust (F7) and Trust in the Political System (F16).

- The activity rate, total (% of the total population aged 15 to 64) (ILO modeled estimate) is negatively correlated by Political and Social Mobilization (F1), Trust in Immigration (F11), and Mass Media Flow (F17) and positive by Associational Activity (F3), Social Trust (F7) and Trust in the Political System (F16).

- Expenditure over GDP is positively correlated to Social Trust (F7) and Wellbeing (F15) and negatively related to Trust in Immigration (F11) and Social Responsibility (F12).

- Unemployment, total (% of the total labor force) (ILO modeled estimate) is indeed correlated to Wellbeing (F15).

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Table 3

Correlations SC-CR economic predictors

Var	CRF1. Country Population Development	Inflationyearly average	GrossdebtofGDP	FiscalbalancepercentofGDP	LaborforceparticipationratetotaloftotalpopulationageEx	penditureofGDP	NetlendingborrowingalsoreferredasoverallbalanceofG	UnemploymenttotaloftotallaborforcemodeledILOestima	Foreigndirectinvestmentnetinflowsof GDP
F1CConfidenceinInternationalOrganizations	0,016	-0,027	-0,057	0,174	0,292	0,218	0,360	-0,387	0,121
F2CConfidenceinpoliticalandsecurityinstitutions	-0,272	0,199	0,060	0,120	0,211	-0,124	0,004	-0,017	0,049
F3CConfidenceinSocialandCharitableOrganizations	0,070	-0,143	-0,116	-0,248	0,163	0,179	-0,048	0,067	-0,006
F1PoliticalandSocialMobilization	0,044	-0,075	0,079	-0,410	-0,322	0,112	-0,142	-0,192	-0,182
F2ToleranceforViolenceAgainstInstitutions	0,467	-0,005	0,160	0,412	-0,127	0,217	-0,092	0,254	-0,001
F3AssociationalActivity	0,516	-0,132	0,012	0,272	0,500	0,391	-0,105	0,019	0,060
F4ToleranceforSexualandRighttoLifeTaboos	-0,422	0,333	-0,170	-0,335	-0,252	-0,276	-0,304	0,142	-0,180
F5NeighborhoodViolence	0,167	-0,251	0,066	-0,072	0,154	0,087	-0,100	-0,001	0,080
F6DigitalCommunicationFlow	0,166	0,140	-0,178	0,162	0,178	0,195	-0,001	-0,103	-0,155
F7SocialTrust	0,394	-0,440	-0,269	0,362	0,317	0,438	0,050	0,091	0,231
F8HouseholdNeedsCoverage	-0,516	0,211	0,174	0,110	-0,210	-0,375	0,033	0,204	0,109
F9Religiosity	-0,508	-0,101	-0,037	-0,303	-0,412	-0,407	-0,199	0,054	-0,225
F10ElectoralCorruption	-0,305	0,231	0,322	-0,227	-0,059	-0,105	-0,196	0,047	-0,223
F11TrustinImmigration	-0,616	0,177	-0,012	-0,121	-0,507	-0,371	-0,028	-0,031	0,073
F12SocialResponsability	-0,214	0,031	-0,001	-0,383	-0,265	-0,456	-0,216	0,072	-0,303
F13ElectoralTrust	-0,045	0,141	0,245	-0,036	-0,325	-0,042	-0,222	0,286	0,147
F14LocalRootedness	0,059	-0,365	-0,088	0,021	0,120	0,062	-0,209	-0,315	-0,059
F15Wellbeing	0,018	-0,358	-0,110	0,107	0,122	0,369	0,102	-0,526	0,129
F16TrustinPoliticalSystem	0,214	-0,109	-0,226	0,357	0,330	0,237	0,017	-0,431	0,179
F17MassMediaFlow	-0,531	0,073	0,112	0,001	-0,361	-0,350	-0,021	-0,084	-0,088

Source: own elaboration

4.3.2 Relationship Between SC-CR Environmental Predictors

In table 4:

- Country Environmental Development (CRF3) correlates positively with Associational Activity (F3) and Digital Communication Flow (F6) and negatively with Trust in Immigration (F11) and Electoral Trust (F13).
- Arable land area correlates positively with Digital Communication Flow (F6) and negatively with Neighborhood Violence (F5).
- The terrestrial and marine protected areas (% of total territorial area) are positively correlated with Associational Activity (F3) and negatively correlated with Confidence in International Organizations (F1C) and Wellbeing (F15).
- The LCB - Growth rate in carbon dioxide emissions from land cover negatively correlates with the Tolerance of Sexual and Right-to-Life Taboos (F4).

Table 4

Correlations SC-CR Environmental predictors

Var	CRF3. Country Environmental Development	Arable land of land area	Terrestrial and marine protected areas of total territorial	LCB Growth rate in carbon dioxide emissions from land cover
F1CConfidenceinInternationalOrganizations	0,171	0,300	-0,341	0,007
F2CConfidenceinpoliticalandsecurityinstitutions	0,073	-0,100	-0,098	-0,181
F3CConfidenceinSocialandCharitableOrganizations	0,178	0,055	0,244	0,016
F1PoliticalandSocialMobilization	-0,071	-0,237	-0,189	-0,037
F2ToleranceforViolenceAgainstInstitutions	0,069	0,088	0,064	-0,002
F3AssociationalActivity	0,302	-0,028	0,339	0,075
F4ToleranceforSexualandRighttoLifeTaboos	0,100	-0,210	0,054	-0,353
F5NeighborhoodViolence	-0,121	-0,381	-0,089	0,097
F6DigitalCommunicationFlow	0,301	0,357	0,089	-0,009
F7SocialTrust	0,105	0,116	-0,255	0,020
F8HouseholdNeedsCoverage	0,035	0,066	-0,085	-0,271
F9Religiosity	-0,132	-0,135	-0,280	-0,060
F10ElectoralCorruption	0,115	0,037	-0,074	-0,251
F11TrustinImmigration	-0,355	0,099	-0,136	-0,307
F12SocialResponsability	-0,031	-0,277	0,081	0,106
F13ElectoralTrust	-0,532	0,086	-0,021	-0,080
F14LocalRootedness	0,216	-0,082	0,093	0,183
F15Wellbeing	-0,052	0,244	-0,393	0,088
F16TrustinPoliticalSystem	0,034	-0,049	0,295	0,112
F17MassMediaFlow	-0,035	0,235	-0,287	-0,143

Source: own elaboration

4.3.3 Relationship Between Political SC CR_OECD Predictors

In table 5:

- Country Democratic Development (CRF2) correlates positively with Confidence in Social and Charitable Organizations (F3C), Associational Activity (F3), and Social Trust (F7) and negatively with Political and Social Mobilization (F1), Social Responsibility (F12), and Mass Media Flow (F17).

Table 5

Correlations Political CS CR_OECD

Var	CRF2. Country Democratic Development
F1CConfidenceinInternationalOrganizations	-0,069
F2CConfidenceinpoliticalandsecurityinstitutions	0,026
F3CConfidenceinSocialandCharitableOrganizations	0,472
F1PoliticalandSocialMobilization	-0,308
F2ToleranceforViolenceAgainstInstitutions	-0,018
F3AssociationalActivity	0,539
F4ToleranceforSexualandRighttoLifeTaboos	0,060
F5NeighborhoodViolence	0,237
F6DigitalCommunicationFlow	0,163
F7SocialTrust	0,357
F8HouseholdNeedsCoverage	-0,274
F9Religiosity	-0,321
F10ElectoralCorruption	0,084
F11TrustinImmigration	-0,326
F12SocialResponsability	-0,450
F13ElectoralTrust	-0,050
F14LocalRootedness	0,171
F15Wellbeing	0,154
F16TrustinPoliticalSystem	0,314
F17MassMediaFlow	-0,541

Source: own elaboration

4.3.4 Relationship Between Technological CS CR_OECD Predictors

In table 6:

- Country R&D Development (CRF4) correlates positively with Confidence in International Organizations (F1C) and Wellbeing (F15).
- Secure Internet Servers per 1 million people correlates positively with Confidence in Social and Charitable Organizations (F3C).

Table 6

Correlations Technological CS CR_OECD

Var	CRF4. Country R&D Development	Secure Internet servers per 1 million people
F1CConfidenceinInternationalOrganizations	0,345	0,182
F2CConfidenceinpoliticalandsecurityinstitutions	-0,113	-0,244
F3CConfidenceinSocialandCharitableOrganizations	0,114	0,439
F1PoliticalandSocialMobilization	-0,165	-0,237
F2ToleranceforViolenceAgainstInstitutions	0,058	0,178
F3AssociationalActivity	0,036	0,470
F4ToleranceforSexualandRighttoLifeTaboos	-0,133	-0,275
F5NeighborhoodViolence	-0,122	-0,044
F6DigitalCommunicationFlow	0,060	0,457
F7SocialTrust	0,250	0,326
F8HouseholdNeedsCoverage	-0,234	-0,238
F9Religiosity	-0,133	-0,499
F10ElectoralCorruption	-0,089	-0,311
F11TrustinImmigration	-0,120	-0,338
F12SocialResponsability	-0,208	-0,370
F13ElectoralTrust	-0,204	-0,212
F14LocalRootedness	-0,123	-0,027
F15Wellbeing	0,332	0,173
F16TrustinPoliticalSystem	0,136	0,481
F17MassMediaFlow	-0,199	-0,387

Source: own elaboration

4.3.5 Relationships Between Ratio CR_OECD with SC Predictors

In table 7:

- Country risk, as measured by the OECD, increases with Religiosity (F9), Trust in Immigration (F11), and Electoral Trust (F13) and decreases with Associational Activity (F3), Digital Communication Flow (F6), and Social Trust (F7).

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Table 7
Correlations CS CR_OECD

Var	CR_OECD
F1CConfidenceinInternationalOrganizations	-0,142
F2CConfidenceinpoliticalandsecurityinstitutions	0,097
F3CConfidenceinSocialandCharitableOrganizations	-0,137
F1PoliticalandSocialMobilization	0,051
F2ToleranceforViolenceAgainstInstitutions	-0,016
F3AssociationalActivity	-0,552
F4ToleranceforSexualandRighttoLifeTaboos	0,103
F5NeighborhoodViolence	-0,165
F6DigitalCommunicationFlow	-0,302
F7SocialTrust	-0,483
F8HouseholdNeedsCoverage	0,126
F9Religiosity	0,376
F10ElectoralCorruption	0,191
F11TrustinImmigration	0,461
F12SocialResponsability	0,311
F13ElectoralTrust	0,391
F14LocalRootedness	-0,232
F15Wellbeing	-0,127
F16TrustinPoliticalSystem	-0,292
F17MassMediaFlow	0,258

Source: own elaboration

5. Discussion and conclusion

5.1 SC-CR Economical Predictors

The Country Population Development (CRF1) is highly correlated with several elements of the Social Capital. In particular, increases can be seen in association with Tolerance of Violence Towards Institutions (F2), Associational Activity (F3), and Social Trust (F7), suggesting that as the population grows or becomes more developed, these particular facets of Social Capital tend to increase. This could imply that more populous or developed societies might foster a more accepting culture of institutional enforcement methods, encourage civic participation, and highly value interpersonal trustworthiness (Beyerlein & Hipp, 2005). Simultaneously, decreases are observed alongside Tolerance of Sexual Taboos and Right to Life (F4), Religiosity (F9), Trust in Immigration (F11), and Mass Media Flow (F17) as CRF1 increases. These patterns may indicate a societal change as population dynamics shift, potentially signaling a departure from classical moral views and a reevaluation of the traditional roles of religion, immigration, and mass media in contemporary society (Beyerlein & Hipp,

2005).

The complex connections between demographic changes and Social Capital prompt us to consider the profound effects of population shifts on societal norms and trust. Some studies have also indicated that Social Capital is inversely associated with homicide and violent crime (Galea et al., 2002). Religiosity has been identified as a significant predictor of community ties (Diop et al., 2018). The impact of different community-related factors, such as civic group involvement, social and racial trust, and political engagement, on charitable giving has been explored, revealing varying levels of influence (Wang & Graddy, 2008).

We observe that increasing levels of annual average inflation negatively correlate with several indicators of social cohesion and individual wellbeing. Specifically, higher inflation rates were negatively correlated with Local Rootedness (F14), Social Trust (F7), and Wellbeing (F15). These findings propose that as inflation escalates, individuals may experience diminished prosperity, weakening ties within their local communities, and a general decline in trust. Easterly & Fischer (1999) found a similar relation: inflation is negatively correlated with improvements in wellbeing, thereby affecting the happiness levels within a society. This relationship indicates that as the cost of living rises, the contentment derived from economic security and stable purchasing power decreases, leading to broader societal discontent.

The studies by Gandelman & Hernandez-Murillo (2009) highlight the impact of the long-term effects of inflation on societal trust. They suggest that the collective memory of high inflation periods can cast a long shadow, affecting trust in the stability and reliability of currencies. This eroded trust can then extend to individuals' prospects about their wellbeing, suggesting that concerns about inflation dampen their overall assessments of life satisfaction. These correlations emphasize the multifaceted impact of economic conditions on the social fabric. They point towards the critical need for monetary policies that strive for price stability to ensure economic efficiency and foster a stable social environment where communal ties and personal wellbeing are enhanced.

The analysis shows that the budget balance negatively correlates with Political and Social Mobilization (F1) and Social Responsibility (F12). This suggests that as the budget surplus increases in proportion to GDP, there could be a tendency for political engagement, and the practice of socially responsible behaviors may decrease. According to Fabrizio & Mody's (2006) study, fiscal conservatism can lead to citizen apathy, as they may perceive less need for civic activism when the government manages finances well. Conversely, it positively correlates with Social Trust (F7) and Trust in Political System (F16), which means that when the government maintains a healthy budget balance, people tend to have more confidence in the reliability and competence of social and political institutions. Bursian et al. (2013) support

this observation. They argue that the public may interpret a healthy fiscal position to indicate efficient and trustworthy governance, which can further enhance faith in these institutions—understanding how fiscal balances may inspire trust in societal and political structures.

Having a balanced budget not only benefits economic stability but also enhances social and political trust. Therefore, it is crucial to establish a budgetary policy that promotes economic stability while also allowing for civic participation. Further research could explore the impacts of fiscal policy on social fabrics and strategies to sustain an equilibrium that promotes economic security and active civic participation.

The activity rate, defined as the proportion of the population aged 15 to 64 involved in work, is inverse correlated with Political and Social Mobilization (F1), Trust in Immigration (F11), and Mass Media Flow (F17). Sousa et al. (2018) findings may offer an interpretive lens, suggesting that as more individuals participate in the workforce, they may have diminished time or inclination for political and social engagement, which may also impact their perceptions of immigration and the media stream. On the contrary, it is positively correlated with Associational Activity (F3), Social Trust (F7), and trust in political systems (F16).

The research by Lorenzini & Giugni (2012) and Schur (2003) indicates that engagement in the labor market might correlate with enhanced opportunities for association, elevated social trust, and greater faith in political institutions, which is coherent with the notion that employment can provide an arena for social interaction and investment in societal structures, leading to stronger social networks and trust in governance. The findings point to a dual-faced narrative where labor engagement encourages some dimensions of Social Capital while inversely affecting others.

It was found that there is a positive correlation between Social Trust (F7), Wellbeing (F15), and the expenditure over GDP. This indicates that targeted public spending could help increase societal trust and individual wellbeing, which could be achieved by providing public services or social benefits that address the community's needs and create a safety net for citizens. Elgar’s (2010) findings highlight that income inequality can diminish social trust, as disparities in income may create fissures in the social fabric that undermine communal bonds and trust. Therefore, government expenditure that effectively reduces income inequality could foster a more cohesive society, enhancing trust among its members. Hessami’s (2010) investigation provides insights into the conditional nature of the impact of government size on wellbeing.

Understanding how different types of government spending affect social trust and wellbeing is crucial. It is not just about the amount spent but also how funds are allocated and managed, their transparency, the accountability of

institutions involved, and the actual impact of services provided. If we explore public perceptions of government efficiency and integrity, we may be better able to determine when to invest resources.

Our analysis indicates an inverse correlation with Trust in Immigration (F11) and Social Responsibility (F12). These findings point toward potential societal gaps or challenges that government action could exacerbate or alleviate. Research conducted by Böheim & Mayr (2005) and Matsuyama & Miyazaki (2017) show that Low-skilled immigration may pressure public resources, leading to a potential strain on social trust and responsibility. In contrast, high-skilled immigration tends to inject vitality into the economy, which could enhance these elements of Social Capital.

The unemployment rate demonstrated a specific connection to Wellbeing (F15), underscoring the profound influence of employment status on societal welfare (Clark, 2003). This relationship aligns with extensive literature that consistently reported lower wellbeing levels among unemployed individuals than their employed counterparts. While our analysis does not delve into the causal mechanisms governing this correlation, historical patterns, and other studies provide a context for interpreting these findings. For instance, the relationship between aggregate unemployment and average happiness indicates that even those employed experience diminished happiness during high unemployment (Winkelmann & Winkelmann, 1995), which could result from increased job insecurity, economic uncertainty, or the societal mood shaped by prevailing employment conditions. Furthermore, the correlation may also encapsulate aspects related to social inclusion, self-esteem, and financial stability, all of which contribute to overall wellbeing.

Employment seems to be a matter of economic activity and a determinant of social cohesion and individual identity. The status of being employed has implications for social connections, mental health, and access to resources. During the COVID-19 pandemic, many workers were unable to perform their jobs due to forced confinement, which resulted in increased emotional distress and worsened mental illness (Rabadán Pérez & Berumen, 2020).

5.2 SC-CR Environmental Predictors

Environmental predictors can significantly impact a country's risk by posing threats to public health, economic stability, and infrastructure. Country Environmental Development (CRF3) is positively correlated with both Associational Activity (F3) and Digital Communication Flow (F6), suggesting that environmentally conscious development may encourage greater civic engagement and information exchange, which could be due to a shared recognition of environmental issues driving community organization and collaboration, facilitated by digital platforms that allow for the dissemination of information and the mobilization of collective action.

On the other hand, the observed negative correlation between Country Environmental Development (CRF3) and Trust in Immigration (F11) alongside Electoral Trust (F13) presents a more complex scenario. It implies that while environmental development might enhance particular social dynamics, it concurrently may relate to societal apprehensions or skepticism towards outsiders and the electoral process. This could be attributed to environmental concerns heightening perceptions of resource competition, which may sour attitudes towards immigration. Similarly, environmental issues might impact electoral trust if there are public perceptions of political actors failing to address these concerns adequately or if environmental policies become politicized, leading to divisions in trust toward electoral mechanisms. Environmental predictors are important in impacting public health and infrastructure and their broader capacity to shape social trust and political dynamics.

Our analysis revealed the association between arable land area and Digital Communication Flow (F6), suggesting that areas with more cultivable land may have higher digital engagement and information dissemination levels. This positive correlation could stem from the fact that agricultural communities increasingly rely on digital technologies for market access, weather forecasts, and innovative farming techniques. The proliferating use of mobile devices and internet connectivity in rural areas likely facilitates this trend, enhancing communication flow.

The arable land area presents an inverse correlation with Neighborhood Violence (F5); it may reflect that agricultural regions, often characterized by less urbanized and densely populated environments, experience lower levels of such violence, which might be due to a variety of social dynamics including close-knit community structures, lower crime rates commonly associated with rural areas, and possibly the engagement in agricultural work itself, which can foster a sense of community cohesion and purpose.
An increased percentage of protected land and sea correlates positively with Associational Activity (F3). This connection suggests that conservation efforts may catalyze collective action and civic participation, potentially through community projects, environmental advocacy groups, and conservation initiatives. These activities could be driven by shared goals of preserving natural heritage, enhancing local development, and fostering community identity tied to the natural environment.

The same protected areas inversely correlate with Confidence in International Organizations (F1C) and Wellbeing (F15). The diminished confidence in international institutions could indicate a perceived disconnect or dissatisfaction with top-down environmental policies or global measures that may not align with local needs and priorities. Local communities might feel that international organizations fail to adequately address or represent their specific interests, leading to a lack of trust.

Furthermore, the negative relationship with wellbeing could speak to the costs of local communities due to conservation efforts—such as restrictions on resource use, changes in livelihoods, or shifts in community dynamics—that might not always be offset by immediate tangible benefits. It raises the potential issue that protected area designation and management need to balance environmental goals with local populations' socio-economic realities and psychological welfare.

The environmental predictors influence urban planning, economic development, and social wellbeing. Environmental risks can adversely affect Social Capital by straining societal networks and resources. For countries facing high environmental risks, it can act as a means of resilience, providing social support and facilitating community-led responses to environmental challenges. Moreover, a country's Social Capital level can significantly influence its capacity for environmental governance, affecting how environmental predictors are managed. A strong social fabric, including cooperative relationships between citizens and institutions, can lead to more effective conservation efforts, greater awareness and education about environmental issues, and a higher likelihood of adopting sustainable practices.

5.3 Political SC CR_OECD Predictors

There is a positive correlation between Country Democratic Development (CRF2) and factors such as confidence in Social and Charitable Organizations (F3C), Associational Activity (F3), and Social Trust (F7), suggesting that democracies may foster an environment where civil society flourishes (Norris, 2002; Putnam, 2000). People in democratic countries might have higher confidence in non-governmental organizations and are more likely to engage in collective activities, potentially due to the freedoms of expression, assembly, and association that characterize democracies.

This higher degree of social trust within democracies posits that citizens generally believe that others in their community are reliable and can expect fair treatment from social institutions and their fellow citizens (Newton, 2001; E. M. Uslaner, 2018). These elements are the bedrock of Social Capital, which significantly contributes to various positive socioeconomic outcomes, including economic development, effective governance, and community resilience.

The negative relationship between Country Democratic Development (CRF2) and Political and Social Mobilization (F1) could suggest that in well-established democracies, there may be a lower perceived need for active mobilization or protest, possibly because citizens feel their voices are already being heard through formal democratic processes (Newton, 2001; Zmerli & Newton, 2008). Alternatively, it might highlight a complacency or lack of urgency in addressing social and political issues within established systems

perceived as stable and relatively just.

5.4 Technological SC CR_OECD Predictors

The positive relationship between R&D (CRF4) and Confidence in International Organizations (F1C) suggests that as countries engage more deeply with innovation and development initiatives, they may become more integrated into the global community, including economic, social, and political systems. This integration may foster greater trust in international bodies, potentially due to shared objectives and cooperation in R&D efforts. Furthermore, the association with Wellbeing (F15) underscores that innovation and development within a country can enhance the quality of life for its citizens, which may include access to higher-quality healthcare, education, and broader economic opportunities that contribute to overall happiness and satisfaction.

Additionally, the positive link between the number of secure internet servers per 1 million people and Confidence in Social and Charitable Organizations (F3C) can indicate that stronger internet security infrastructure correlates with greater public trust in these organizations. This correlation might be attributable to the increasing reliance on digital technologies for information dissemination, fundraising, and social networking. Secure online environments enable these organizations to maintain reputations of reliability and transparency, which are critical for public support and participation.

These correlations also have important implications for country risk assessment. A nation's engagement with R&D can signal a proactive approach to addressing global challenges, which contributes to the wellbeing of its citizenry and can facilitate stronger international partnerships, potentially reducing country risk. Conversely, the number of secure internet servers signifies robust technological infrastructure and a commitment to cybersecurity, which can reinforce the Social Capital of non-governmental sectors by cementing trust through secure digital interactions.

5.5 Ratio CR_OECD with SC Predictors

The research findings indicate that there is a direct relationship between country risk and Religiosity (F9), Trust in Immigration (F11), and Electoral Trust (F13), which means that societies with higher levels of country risk tend to have stronger religious beliefs and show more trust in the fairness and effectiveness of their electoral systems. It might seem paradoxical that trust in institutions like immigration systems and elections correlates with increased country risk. However, this could reflect underlying societal tensions or disparities that, while not eroding trust in certain institutions, contribute to overall risk.

Religious organizations play an important role in establishing collaborative networks to mitigate the situation when a country faces economic difficulties, security problems, and political and social tensions. Religion does not necessarily cause country risk but acts as a resource to address and alleviate existing difficulties.

Trust in immigration may imply contentious immigration policies that could create social friction or economic strain. The electoral trust might indicate a deeply polarized society that, despite confidence in electoral processes, faces risks due to political divisiveness (Birch, 2010; Bjørnskov, 2010; Morris & Klesner, 2010).

On the other hand, the negative correlations with Associational Activity (F3), Digital Communication Flow (F6), and Social Trust (F7) indicate that societies with active civil engagement, robust digital communication networks, and higher levels of mutual trust among citizens tend to have lower country risk. Associational activity reflects the degree to which citizens actively engage in civil society, which can contribute to social cohesion and mitigate risk. Digital communication facilitates the spreading of information and ideas, promoting transparency and accountability, which may deter corruption and mismanagement.

The insights presented here could be important for policymakers. They highlight the importance of developing and promoting strong social networks, investing in digital infrastructure to facilitate effective communication, and fostering a culture of social trust. These are all essential strategies for mitigating risk. Addressing the root causes of societal insecurities related to religion, immigration, and political processes can also play a vital role in reducing country risk.

This research work has verified that there are significant statistical relationships between social capital variables and standard predictors for assessing country risk, which supports the thesis that addressing the risk issue is synonymous with the study of trust. Although most of the research findings are consistent with the literature, some statistical relationships do not seem consistent and are surprising, suggesting the need to investigate intermediation variables and interactions in future research.

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ANNEXES

Section I Classification of Variables Participating in the study

Table 8

Economic Variables

Variables	Source
Expenditure (% of GDP)	ID: GC.XPN.TOTL.GD.ZS International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank and OECD GDP estimates (2017-2022)
Fiscal balance, percent of GDP	Fiscal balance, a percent of GDP sometimes referred to as the government budget balance, is the difference between a government's revenues (taxes and proceeds from asset sales) and its expenditures. It is often expressed as a ratio of Gross Domestic Product (GDP) from the Focus Economics (2017-2022)
GDPpercap2GDPpercapita PPPconstant2017international$	ID: NY.GDP.PCAP.PP.KD International Comparison Program, World Bank | World Development Indicators database, World Bank | Eurostat-OECD PPP Programme (2017-2022)
Gross debt (% of GDP)	Gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or future date. World Economic Outlook (2017-2022)
Inflation (yearly average, %)	ID: FP.CPI.TOTL.ZG World Bank, International Monetary Fund, International Financial Statistics and data files (2017-2022)
Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate)	ID: SL.TLF.ACTI.ZS International Labour Organization. "ILO modeled estimates database" ILOSTAT. It is accessed on September 05, 2023. ilostat.ilo.org/data (2017-2022)
Net lending/borrowing (also referred as overall balance) (% of GDP)	ID: GC.NLD.TOTL.GD.ZS International Monetary Fund, Government Finance Statistics Yearbook and data files (2017-2022)
Unemployment, total (% of total labor force) (modeled ILO estimate)	ID: SL.UEM.TOTL.ZS International Labour Organization. "ILO Modelled Estimates and Projections database (ILOEST)" ILOSTAT. Accessed September 05, 2023. ilostat.ilo.org/data (2017-2022)
Foreign direct investment, net inflows (% of GDP)	ID: BX.KLT.DINV.WD.GD.ZS International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International Debt Statistics, and World Bank and OECD GDP estimates (2017-2022)

Table 9

Environmental Variables

Variables	Source
Agriculture, forestry, and fishing, value added (% of GDP)	ID: NV.AGR.TOTL.ZS World Bank national accounts data and OECD National Accounts data files (2017-2022)
Access to electricity (% of population)	ID: EG.ELC.ACCS.ZS IEA, IRENA, UNSD, World Bank, WHO. 2023. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. © World Bank. License: Creative Commons Attribution—Non Commercial 3.0 IGO (CC BY-NC 3.0 IGO) (2017-2022)
Agricultural land (sq. km)	ID: AG.LND.AGRI.K2 World Bank, Food and Agriculture Organization, electronic files and website (2017-2022)
Arable land (% of land area)	ID: AG.LND.ARBL.ZS World Bank, Food and Agriculture Organization, electronic files and website (2017-2022)
CDA - Adjusted emissions growth rate for carbon dioxide	Adjusted emissions growth rate for carbon dioxide from Environmental Performance Index 2017-2027
Forest area (sq. km)	ID: AG.LND.FRST.K2 World Bank, Food and Agriculture Organization, electronic files and website (2017-2022)
GHN - Projected GHG Emissions in 2050	Projected GHG Emissions in 2050 from Environmental Performance Index 2017-2022
LCB - Growth rate in carbon dioxide emissions from land cover	Growth rate in carbon dioxide emissions from land cover from Environmental Performance Index 2017-2022
Methane emissions (kt of CO2 equivalent)	Marine protected areas from Environmental Performance Index 2017-2022
Nitrous oxide emissions (thousand metric tons of CO2 equivalent)	ID: EN.ATM.NOXE.KT.CE World Bank, Climate Watch Historical GHG Emissions (1990-2020). 2023. Washington, DC: World Resources Institute. Available online at climatewatchdata.org/ghg-emissions (2017-2022)
Terrestrial and marine protected areas (% of total territorial area)	ID: ER.PTD.TOTL.ZS World Bank, World Database on Protected Areas (WDPA), where the compilation and management are carried out by the United Nations Environment World Conservation Monitoring Centre (UNEP-WCMC) in collaboration with governments, non-governmental organizations, academia, and industry. The data is available online through the Protected Planet website (2017-2022)

Table 10

Political Variables

Variables	Source
Control of Corruption	ID: CC.EST, the Worldwide Governance Indicators (WGI) project constructs aggregate indicators of six broad governance dimensions. Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption and "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator in units of standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.
Ease of doing business ranking (DB17-21)	ID: IC.BUS.DFRN.XQ World Bank, Doing Business project (doingbusiness.org). NOTE: Doing Business has been discontinued as of 9/16/2021. For more information: bit.ly/3CLCbme (2017-2021)
FCT1. Democratic Freedom	World Value Survey (2017-2022)
homiciderateHomiciderateper 100000 peopleUNDP20122018	World Value Survey (2017-2022)
P3: Human Rights	Political Indicator of Fragile States Index 2017-2022
PR Rating=Political Rights Rating	Freedom House rates people's access to political rights and civil liberties in 210 countries and territories through its annual Freedom in the World reportInvase scale (2017-2022)
Rule of Law	ID: RL.EST, the Worldwide Governance Indicators (WGI) project constructs aggregate indicators of six broad governance dimensions. Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.
Control of Corruption	ID: VA.EST Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data are available at govindicators.org. Voice and Accountability capture perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media. Estimate gives the country's score on the aggregate indicator in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5 (2017-2022)

Table 11

Sociological Variables

Variables	Source
C2: Factionalized Elites	Cohesion Indicator of Fragile States Index 2017-2022
C3: Group Grievance	Cohesion Indicator of Fragile States Index 2017-2022
FCT2. Emigration Potential	World Value Survey (2017-2022)
Mortality rate under-5 (per 1,000 live births)	ID: SH.DYN.MORT Estimates developed by the UN Inter-agency Group for Child Mortality Estimation (UNICEF, WHO, World Bank, UN DESA Population Division) at www.childmortality.org (2017-2022)
Population growth (annual %)	ID: SP.POP.GROW Derived from total population. Population source: (1) United Nations Population Division. World Population Prospects: 2022 Revision, (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Report (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme. (2017-2022)

Table 12

Technological Variables

Variables	Source
High-technology exports (current US$)	ID: TX.VAL.TECH.CD World Bank, United Nations, Comtrade database through the WITS platforms (2017-2022)
Patent applications, residents	ID: IP.PAT.RESD World Bank, World Intellectual Property Organization (WIPO), WIPO Patent Report: Statistics on Worldwide Patent Activity. The International Bureau of WIPO assumes no responsibility concerning the transformation of these data (2017-2022)
Scientific and technical journal articles	ID: IP.JRN.ARTC.SC World Bank, National Science Foundation, Science and Engineering Indicators (2017-2022)
Secure Internet servers (per 1 million people)	ID: IT.NET.SECR.P6 Netcraft (netcraft.com) and World Bank population estimates (2017-2022)

Table 13

Social Capital Relational. Source: Ramírez-Muñoz et al. (2023)

Variables	Source
F17MassMediaFlow	From Ramírez-Muñoz et al. (2023)
F2ToleranceforViolenceAgainstInstitutions	From Ramírez-Muñoz et al. (2023)
F9Religiosity	From Ramírez-Muñoz et al. (2023)

Table 14

Social Capital Structural. Source: Ramírez-Muñoz et al. (2023)

Variables	Source
F14LocalRootedness	From Ramírez-Muñoz et al. (2023)
F3AssociationalActivity	From Ramírez-Muñoz et al. (2023)
F5NeighborhoodViolence	From Ramírez-Muñoz et al. (2023)
F6DigitalCommunicationFlow	From Ramírez-Muñoz et al. (2023)
F8HouseholdNeedsCoverage	From Ramírez-Muñoz et al. (2023)

Table 15

Social Capital Cognitive. Source: Ramírez-Muñoz et al. (2023)

F10ElectoralCorruption
F11TrustinImmigration
F12SocialResponsability
F13ElectoralTrust
F15Wellbeing
F16TrustinPoliticalSystem
F1CConfidenceinInternationalOrganizations
F1PoliticalandSocialMobilization
F2CConfidenceinpoliticalandsecurityinstitutions
F3CConfidenceinSocialandCharitableOrganizations
F4ToleranceforSexualandRighttoLifeTaboos
F7SocialTrust

Table 16

Social Capital Relational. Source: Ramírez-Muñoz et al. (2023)

F17MassMediaFlow
F2ToleranceforViolenceAgainstInstitutions
F9Religiosity

Table 17

Social Capital Structural. Source: Ramírez-Muñoz et al. (2023)

F14LocalRootedness
F3AssociationalActivity
F5NeighborhoodViolence
F6DigitalCommunicationFlow
F8HouseholdNeedsCoverage

Section II Little's Test Results for MCAR (Missing Completely At Random)

Variables not included in the study are marked in italics.

Table 18

MCAR Data, Little's Test. Source: Own elaboration

variable	percent_missing	Little's statistic
Technicians in R&D (per million people)	*82,051282*	*1,478E-31*
Primary completion rate, total (% of relevant age group)	*33,333333*	*4,519E-29*
Cyclically adjusted primary balance (% of potential GDP)	*28,205128*	*1,161E-32*
School enrollment, primary and secondary (gross), gender parity index (GPI)	*25,641026*	*2,231E-28*
Annual freshwater withdrawals, total (% of internal resources)	20,512821	1,023E-31
CO2 emissions (kg per PPP $ of GDP)	20,512821	2,104E-30
CO2 emissions (kt)	20,512821	2,147E-31
Nitrous oxide emissions (thousand metric tons of CO2 equivalent)	20,512821	3,555E-31
Agricultural land (sq. km)	15,384615	2,823E-31
Cereal yield (kg per hectare)	10,25641	2,729E-30
Patent applications, residents	10,25641	4,931E-32
Net lending/borrowing (also referred as overall balance) (% of GDP)	7,6923077	9,572E-31
Population in urban agglomerations of more than 1 million (% of total population)	7,6923077	1,995E-30
Primary net lending/borrowing (also referred as primary balance) (% of GDP)	7,6923077	8,337E-32
Charges for the use of intellectual property, payments (BoP, current US$)	5,1282051	1,771E-31
FCT1. Democratic Freedom	5,1282051	3,928E-32
FCT2. Emigration Potential	5,1282051	2,933E-32
lifeexpectHDILifeexpectancyIndex0to1UNDP2018	5,1282051	2,349E-31
Foreign direct investment, net inflows (% of GDP)	2,5641026	2,861E-32

Table 19

Missing Data, no MCAR, Little's Test. Source: Own elaboration

variable	percent_ missing
Agricultural irrigated land (% of total agricultural land)	64,102564
Researchers in R&D (per million people)	46,153846
Net debt (% of GDP)	43,589744
Research and development expenditure (% of GDP)	38,461538
Taxes on international trade (% of revenue)	33,333333
Global Cybersecurity Index (Score)	30,769231
Cyclically adjusted balance (% of potential GDP)	28,205128
Tax revenue (% of GDP)	28,205128
Average precipitation in depth (mm per year)	23,076923
Marine protected areas (% of territorial waters)	23,076923
Annual freshwater withdrawals, total (billion cubic meters)	20,512821
Budget balance (% GDP)	20,512821
CO2 emissions (kg per 2015 US$ of GDP)	20,512821
CO2 emissions (kg per 2017 PPP $ of GDP)	20,512821
CO2 emissions (metric tons per capita)	20,512821
Ease of doing business ranking (DB17-21)	20,512821
Methane emissions (kt of CO2 equivalent)	20,512821
Renewable energy consumption (% of total final energy consumption)	20,512821
Secure Internet servers (per 1 million people)	20,512821
Social globalization index (0-100), 2017 - Country rankings	20,512821
Total greenhouse gas emissions (kt of CO2 equivalent)	20,512821
Access to electricity (% of population)	10,25641
Agricultural land (% of land area)	10,25641
Arable land (% of land area)	10,25641
Charges for the use of intellectual property, receipts (BoP, current US$)	10,25641
Employers, total (% of total employment) (modeled ILO estimate)	10,25641
Forest area (% of land area)	10,25641
Forest area (sq. km)	10,25641
High-technology exports (% of manufactured exports)	10,25641
Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate)	10,25641
Mortality rate, under-5 (per 1,000 live births)	10,25641
Patent applications, nonresidents	10,25641
Scientific and technical journal articles	10,25641
TradeTradeofGDPWorldBank2019	10,25641
Expenditure (% of GDP)	7,6923077
Gross debt (% of GDP)	7,6923077
High-technology exports (current US$)	7,6923077

Revenue (% of GDP)	7,6923077
Agriculture, forestry, and fishing, value added (% of GDP)	5,1282051
Government spending as a percent of GDP	5,1282051
Individuals using the Internet (% of population)	5,1282051
Inflation (yearly average, %)	5,1282051
Exports of goods and services (% of GDP)	2,5641026
Fiscal balance, percent of GDP	2,5641026
GDP growth (%)	2,5641026
GDPpercap2GDPpercapitaPPPconstant2017international$	2,5641026
GIIGenderInequalityIndexGII0to1UNDP2018	2,5641026
Imports of goods and services (% of GDP)	2,5641026

Table 20

CR Correlation Matrix (part I). Source: Own elaboration

Var	CRF1.	CRF2.	CRF3.	CRF4.	Inflation	Gross debt of GDP	Fiscal balance %GDP	Arable land
CRF1. Population Development	1,00	0,02	0,01	0,01	-0,12	0,07	0,39	-0,12
CRF2. Democratic Development	0,02	1,00	0,00	0,00	-0,28	-0,10	0,02	0,07
CRF3. Environmental Development	0,01	0,00	1,00	0,02	-0,09	-0,24	0,00	0,06
CRF4. I&D Development	0,01	0,00	0,02	1,00	-0,06	-0,11	0,37	-0,01
Inflation yearly average	-0,12	-0,28	-0,09	-0,06	1,00	0,13	0,00	-0,09
Grossdebt of GDP	0,07	-0,10	-0,24	-0,11	0,13	1,00	-0,02	-0,06
Fiscal balance percent of GDP	0,39	0,02	0,00	0,37	0,00	-0,02	1,00	0,12
Arable land o fland area	-0,12	0,07	0,06	-0,01	-0,09	-0,06	0,12	1,00
Secure Internet servers per 1 million people	0,33	0,43	0,06	0,34	-0,11	-0,12	0,30	0,11
Laborforce participation rate total of total populationage	0,33	0,30	0,21	0,25	-0,08	-0,13	0,32	-0,05
Expenditure of GDP	0,32	0,46	0,02	-0,01	-0,30	0,05	0,15	0,16
Terrestrial land marine protected areas of total territorial	0,16	0,15	0,04	-0,11	0,25	0,19	-0,08	-0,21
Netlending borrowing also referred as overall balance of GDP	0,09	-0,07	0,05	0,20	0,17	-0,06	0,24	0,04
Unemployment total of total laborforce modeled ILO estimate	0,04	0,09	-0,06	-0,31	0,05	0,26	-0,04	-0,08
LCB Growth rate in carbon dioxide emissions from land cover	0,24	-0,01	-0,12	0,03	0,03	0,12	-0,17	-0,24
Foreign direct investment net inflows of GDP	0,06	0,28	-0,09	-0,15	-0,08	-0,20	0,13	-0,04

Table 21

CR Correlation Matrix (part II). Source: Own elaboration

Var	Secure Internet servers	Laborforce	Expenditure of GDP	Terrestrial and marine protected	Netlending borrowing	Unemployment	LCB	Foreign direct investment
CRF1. Population Development	0,33	0,33	0,32	0,16	0,09	0,04	0,24	0,06
CRF2. Democratic Development	0,43	0,30	0,46	0,15	-0,07	0,09	-0,01	0,28
CRF3. Environmental Development	0,06	0,21	0,02	0,04	0,05	-0,06	-0,12	-0,09
CRF4. I&D Development	0,34	0,25	-0,01	-0,11	0,20	-0,31	0,03	-0,15
Inflation yearly average	-0,11	-0,08	-0,30	0,25	0,17	0,05	0,03	-0,08
Grossdebt of GDP	-0,12	-0,13	0,05	0,19	-0,06	0,26	0,12	-0,20
Fisca balance percent of GDP	0,30	0,32	0,15	-0,08	0,24	-0,04	-0,17	0,13
Arable land o fland area	0,11	-0,05	0,16	-0,21	0,04	-0,08	-0,24	-0,04
Secure Internet servers per 1 million people	1,00	0,23	0,32	0,34	0,02	-0,16	0,30	0,06
Laborforce participation rate total of total populationage	0,23	1,00	0,18	0,13	0,22	-0,16	0,20	0,16
Expenditure of GDP	0,32	0,18	1,00	-0,01	0,05	0,03	0,05	-0,06
Terrestrial land marine protected areas of total territorial	0,34	0,13	-0,01	1,00	-0,14	-0,09	0,34	-0,25
Netlending borrowing also referred as overall balance of GDP	0,02	0,22	0,05	-0,14	1,00	0,03	-0,03	0,19
Unemployment total of total laborforce modeled ILO estimate	-0,16	-0,16	0,03	-0,09	0,03	1,00	-0,13	0,04
LCB Growth rate in carbon dioxide emissions from land cover	0,30	0,20	0,05	0,34	-0,03	-0,13	1,00	-0,19
Foreign direct investment net inflows of GDP	0,06	0,16	-0,06	-0,25	0,19	0,04	-0,19	1,00

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