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The Political Survival of Global Environmental Public Goods: The Case of the United Nations Environmental Programme.

Jager, Sjoerd Jelmer de

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International Cooperation and the Design of Global Economic Institutions

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Sjoerd de Jager

S2496577

Supervisor: Dr. Michael Sampson

Second reader: Dr. Matthew di Giuseppe

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Introduction

A perennial debate in international relations focuses on the merits of different regime types (Mansfield, Milner & Rosendorff, 2002, p. 477). In international political economy, this debate has concentrated on the differences in economic outcomes between democracies and autocracies. For this, scholars have focused on a wide range of topics including economic growth (Barro, 1997; McGuire & Olson, 1996; Lipset, 1959), trade liberalization (Hellman, 1998; Przeworski, 1991), and rent-seeking behaviour (Krueger, 1974; Wintrobe, 1990). In this debate, it is often argued that democracies, generally speaking, deliver better economic outcomes (Doucouliagos & Ulubasoglu, 2008, pp. 78-78). Even though scholars have yet to reach a consensus on an explanation for many of these differences, an overall difference between democracies and autocracies thought to influence or even cause the other differences is the difference in public good provision (Hochman & Hochman, 1980, pp. 1233-1234). Public goods are essential for an economy to properly function and, therefore, have a major impact on many economic outcomes. Good infrastructure and education, for example, are essential for sustainable economic growth (Acemoglu, Naidu, Restrepo & Robinson, 2019).

As with the differences already discussed, political economists have discussed at length the difference in public good provision. Among these scholars, there is a broad consensus that democracies provide more public goods than autocracies (Deacon, 2009; Lake & Baum, 2001). Despite the extensive research, for long, scholars have mostly failed to explain observed differences within these two categories. However, the more recently developed selectorate theory provides a theoretical framework that could incorporate differences within these classical categories. Instead of focusing on a binary distinction between democracies and autocracies, selectorate theory focuses on a continuous variable describing the ratio of coalitions within a state. Furthermore, the theory argues that all leaders want to survive in office and, therefore, use government revenues to satisfy their coalition of necessary supporters. Building upon these assumptions, the theory holds that the smaller the leader's coalition, the more he will focus on private goods, while the larger his coalition, the more he will focus on public goods (Bueno de Mesquita, Smith, Siverson & Morrow, 2003, pp. 51-55).

Global public goods are a particular class of public goods because of their global nature. Examples of global public goods include macroeconomic stability, climate change mitigation, and international law. Despite the importance of these goods, relatively few

studies have focused on their provision. In general, scholars argue that democracies are more open to international cooperation and contribute more to global governance (Mansfield, Milner & Rosendorff, 2002). Hence the expectation is that democracies contribute more to global public goods, but a clear theoretical framework behind this expectation is missing (Mansfield, Milner & Rosendorff, 2002, pp. 477-478).

Building upon the theoretical framework of selectorate theory, this research argues that domestic political survival considerations of political leaders are pivotal for explaining the willingness of states to contribute to global public goods. This argument is developed by analysing the influence of the size of the domestic winning coalition of a political leader on the contributions of the state to global public goods for the environment. Therefore, the research question is:

What is the influence of domestic winning coalition size on the contribution of states to global environmental public goods?

The answer to this research question is of both theoretical and practical importance. Theoretically, it will contribute to the further development of selectorate theory, possibly improving the overall explanatory power of the theory, and it will provide additional insight into the influence of regime type on (economic) outcomes. Practically, the findings contribute to a better understanding of the delivery of global public goods and can, therefore, contribute to the formulation of international policies aimed at overcoming the often-present cooperation problems associated with the provision of global public goods. This, in turn, can contribute to socially desirable goals such as economic stability, global health and peace. In particular, through the focus on global environmental public goods, the findings can contribute to the formulation of an improved international environmental policy and thereby support climate change mitigation and the protection of biodiversity.

Theoretical Framework

In this section, the theoretical foundations of this research are discussed, starting with selectorate theory and its explanation of the provision of public goods. Building upon that, it is discussed to what extent the unique characteristics of global public goods change the framework of selectorate theory. After establishing this, the focus shifts towards the different ways in which states can contribute to global public goods and how suitable those are for

investigating. Finally, the section will define the main concepts of the research and formulate the hypotheses.

Political Survival and Public Goods

Selectorate theory has two main assumptions. The first one is that the primary goal of all political leaders, no matter the regime type, is to stay in office (Bueno de Mesquita et all, 2003, pp. 51-55). That is not to say that political survival is necessarily the only goal of leaders. There is plenty of evidence that political leaders are also motivated by more ideological goals, such as promoting certain government policies or altruistically helping people (Fedele & Naticchioni, 2016). However, no matter the goal of the political leader, he normally needs to be and needs to stay in office to realize it. It is, therefore, realistic to assume that in general leaders do care deeply about political survival (Bueno de Mesquita et all, 2003, p. 53).

The second main assumption is that all leaders, to survive in office, need to satisfy a group of supporters. This group is called the winning coalition. The size of the winning coalition differs widely across regimes. In democracies, leaders can need as many as half of all votes to stay in office, while in the most autocratic states leaders only need the support of a small elite (Bueno de Mesquita et all, 2003, pp. 51-55). Moreover, the winning coalition is not fixed, meaning that people can leave. Therefore, if the leader wants to remain in office, he needs to provide sufficient benefits to those in his winning coalition otherwise some of these members might leave. This logic is also supported by research in international political economy. For example, scholars have often found a relationship in democracies between economic performance and regime popularity (Norpoth, 1984, pp. 268-270). Even though there are possibly other factors influencing the decisions of members of the winning coalition, such as personal relations with the leader or again ideology, research indicates that (economic) benefits play a pivotal role (Norpoth, 1984, pp. 268-270).

Building upon these two assumptions, selectorate theory argues that leaders will use the government's revenue to ensure the continued loyalty of the winning coalition by providing them with goods (Bueno de Mesquita et all, 2003, pp. 51-55). Leaders can use either public or private goods. Public goods are goods that are non-excludable, no one can be excluded from using the good, and non-rivalrous, meaning that the consumption of one person does not reduce the ability of others to access the good (Uitto, 2016, p. 108). Examples of public

goods include public education, rule of law, and infrastructure. As a result, public goods benefit all constituents and, therefore, provide no additional benefit to those inside the winning coalition. As a consequence, there are no real costs in leaving the winning coalition, and for example, supporting a challenger, so the loyalty of the members of the winning coalition will be low (Bueno de Mesquita et all, 2003, pp. 65-68). Private goods are the opposite of public goods. Contrary to public goods, they are both excludable and rivalrous (Mankiw, 2012, p. 226). Examples include luxurious sportscars or mansions. In this case, there are large benefits related to membership of the winning coalition and consequently, the loyalty will be high. Because the loyalty of the winning coalition is largest with private goods, leaders will prefer to use them instead of public goods (Bueno de Mesquita et all, 2003, p. 68).

However, this is not a viable option under all circumstances. When a leader relies on only a small group of supporters, it is possible to buy expensive private goods for all of them. However, if the winning coalition is large, in some democracies more than half of all voters, the leader simply does not have enough resources to buy expensive private goods for all, necessary, supporters. In this case, the members of the winning coalition benefit more from good public goods than from the small number of private goods the leader can provide to all of them. To summarize, in the logic of selectorate theory, the larger the winning coalition of a political leader, the more he will focus on providing public goods (Bueno de Mesquita et all, 2003, pp. 58-59).

Using this framework, selectorate theory has produced promising results in various areas in the past two decades. Initially, the theory focused on differences in tax levels, economic growth, and the provision of public goods (Bueno de Mesquita et all, 2003, pp. 51-55). After this focus yielded good results, the theory has been applied to other, more international, areas. The theory has especially been successful in explaining patterns of foreign aid and its results on democratization (Bueno de Mesquita & Smith, 2007; Tan, 2021).

One final note is in place here. The focus on either public or private goods is a simplification of a more complex reality that encompasses more types of goods. Besides public and private goods, there are also common goods and club goods (Mankiw, 2012, pp. 226-227). On top of that, many goods do not perfectly fall within one of those categories. These are often referred to as quasi-goods (Elbakidze, Nayga, Li & McIntosh, 2012, p. 253). However, most scholars agree that states mainly focus on public and private goods (Bierbrauer & Winkelmann, 2020).

Besides, the fact that some goods do not perfectly match the characteristics of these goods should not interfere with the basic logic of selectorate theory concerning the working of these goods.

Global Public Goods

As discussed in the previous section, selectorate theory has successfully provided a theoretical framework to explain the differences in public good provision across states. However, global public goods differ from regular or domestic public goods because, if provided, not just one state but all states benefit (Uitto, 2016, pp. 108-109). Consequently, it is necessary to investigate whether this difference fundamentally alters the logic set forth by selectorate theory. Therefore, the most important differences and their consequences are discussed in this section.

First of all, when a global public good is provided, not only the constituents of one leader benefit but the constituents of practically all leaders (Uitto, 2016, pp. 108-109). Even though this is a significant difference, it should not be a major obstacle. In the end, since leaders primarily care about political survival, the fact that other constituents benefit as well should not be a top concern for them (Bueno de Mesquita et all, 2003, pp. 55-57).

Secondly, it is hardly ever possible for one state to produce the global public good individually. In general, international, or even global, cooperation is required (Barrett, 2010). Without a doubt, this prerequisite complicates the production of global public goods enormously and it certainly is one of the main reasons for the underproduction of these goods (Long & Woolley, 2009, p. 115). However, again taking political survival as the starting point, it should not change the logic. Even though the required cooperation complicates the production, leaders with a large winning coalition should still value the global public goods more, because they rely on such goods for satisfying their winning coalition, and would, therefore, be willing to contribute more. Moreover, this level of involvement is not expected to change after the establishment of global cooperation, because the continued provision of the global public good is necessary for leaders relying on public goods for keeping their winning coalition satisfied.

Finally, and most fundamentally, there is the question of why leaders, taking the additional complications outlined above into account, would (also) use global public goods instead of just domestic public goods. Unfortunately, selectorate theory does not provide a clear

explanation for why leaders decide to (not) focus on a particular public good (Bueno de Mesquita et all, 2003, pp. 51-55). Nevertheless, there are at least two reasons for leaders to also focus on (certain) global public goods. On the one hand, there is a preference argument. To satisfy the winning coalition, leaders provide goods but for this to work, those also need to be the goods the winning coalition values. While some preferences can be met domestically, for others global public goods are necessary. For example, research indicates that in most large winning coalition states, climate change mitigation is among the highest priorities (Arts, 1998; Baumgartner, Berry, Hojnacki, Kimball & Leech, 2009; Carpenter, 2001). On the other hand, there is also a cost argument. If leaders keep investing in the same public goods, like infrastructure or education, they will encounter diminishing returns. Simply put, when there already exists a good infrastructure, more investments will yield smaller and smaller returns (Laury, Walker & Williams, 1999, p. 145). This will make investments in global public goods, with possibly much higher returns if produced, more attractive.

All in all, even though this discussion of global public goods demonstrates that there are some important differences with domestic public goods, there is no reason to assume these differences fundamentally change the logic of selectorate theory about the provision of public goods. However, there is reason to believe that leaders will focus only on (global) public goods that are either highly valued by the winning coalition or yield high returns.

Global Environmental Public Goods

The logic as discussed above should work similarly for all global public goods that are either highly valued or yield high returns. This research investigates this assumption by focusing on global environmental public goods. Global environmental public goods offer an interesting case for multiple reasons. First of all, worldwide, there is a lot of demand for these goods (Arts, 1998: Baumgartner, Berry, Hojnacki, Kimball & Leech, 2009; Carpenter, 2001). All around the world, citizens have expressed their concern about environmental degradation, and large-scale protests have demanded state action. As discussed above, constituent's preferences are arguably one of the main reasons why leaders with large coalitions focus on (global) public goods and global environmental public goods are currently among the most demanded ones (Arts, 1998; Baumgartner, Berry, Hojnacki, Kimball & Leech, 2009; Carpenter, 2001). Another reason why global environmental public goods offer an interesting case is because of their true global nature. Where some global public goods have more

limited substitutes, for example European instead of global macroeconomic coordination, this is impossible for the environment. Climate change, loss of biodiversity, and water pollution can only be solved globally (Uitto, 2016, pp. 108-109). This makes global environmental public goods a representative example of pure global public goods.

State Contribution to Global Public Goods

There are various ways in which states can contribute to global public goods. For one, states can contribute through domestic action (Buchholz, Cornes & Rübbelke, 2014, pp. 207-208). Take for example climate change mitigation, simply described as actions taken to limit the impact of climate change (Tyler & Cohen, 2020, pp. 1210-1211). Central to the problem of climate change is global warming which is caused by the emission of greenhouse gases (Wong, 2016, p. 5). Therefore, the most direct way in which states can contribute to this global public good is by domestically reducing the emission of greenhouse gases. However, even though there are comparable data about greenhouse gas emissions, it is hard to draw inferences between changes in emissions and the willingness of states to contribute to this global public good. There are several other reasons why these emissions fluctuate within and between states. For one, external factors can have an enormous impact. For example, emissions dropped significantly during the COVID-19 lockdowns (Ray, Singh, Singh, Acharya & He, 2022). Moreover, there are also plenty of political and economic reasons. Emissions can, for example, also drop because a major polluter in a state changed to a new production method or filed for bankruptcy. The many alternative explanations, requiring a deep understanding of each case, make domestic contributions an unsuitable measure for this study.

Another way in which contributions of states to global public goods can be measured is by focusing on their relative contribution to the intergovernmental organizations created to coordinate the production of this good. Since the production of global public goods requires international cooperation, states create intergovernmental organizations to coordinate this. Intergovernmental organizations are organizations with primarily states as members. Some examples are the International Monetary Fund for creating macro-economic stability and the World Health Organization for promoting global health. In the case of global environmental public goods, the United Nations Environmental Programme (UNEP) is the main intergovernmental organization (Ivanova, 2010). UNEP was founded in 1972 to provide

global environmental leadership and promote international environmental cooperation (United Nations Environment Programme, n. d.-a).

States contribute to UNEP in various ways. First of all, about 95% of UNEP's budget comes from the voluntary contributions of states. States can make financial contributions to two funds. The first is the Environmental Fund which is the core fund for providing UNEP with the necessary resources to carry out its work programme (United Nations Environment Programme, n. d.-b). The second is the Earmarked Fund. When making contributions to this fund, the donor specifies for which project, theme, or state the funds should be used (United Nations Environment Programme, n. d.-c). Besides financial contributions, states can also make technical contributions. Primarily, states can decide to become a member of the Committee of Permanent Representatives. The state's representatives in this committee are responsible for providing policy advice to UNEP's main governing body (the UN Environment Assembly), preparing and contributing to the agenda, and monitoring the implementation of adopted decisions (United Nations Environment Programme, n. d.-d). Important to note is that all these contributions are voluntary. Membership of UNEP is not mandatory and members of UNEP are not required to make certain (minimum) contributions (United Nations Environment Programme, n. d.-e). This voluntary nature makes it possible to observe how much states are willing to contribute.

However, it remains possible that states contribute for other reasons than satisfying the domestic winning coalition. In particular, international relations scholars have discussed legitimacy-seeking as an alternative motive (Simmons, 2009). To illustrate, research shows that many states sign international human rights treaties not because they value them but because they believe it will gain them legitimacy at a low cost (Simmons, 2009). Similarly, virtually all states, including the biggest polluters without policies to improve this, are a member of UNEP (United Nations Environment Programme, n. d.-a). This suggests that legitimacy-seeking is also present in international environmental policies. However, research has indicated that while legitimacy-seeking is related to membership of organizations and the signing of treaties, it is much less related to actual contributions (Simmons, 2009). Again, the case of UNEP seems to confirm this expectation. Even though virtually all states are members, 193 in total, only 79 made financial contributions in 2021 and as of today, only 127 are a member of the Committee of Permanent Representatives (United Nations Environment Programme, n. d.-d; United Nations Environment Programme, n. d.-e). Consequently,

legitimacy-seeking does not seem to influence contributions as much as membership. Moreover, the broad focus of this research on financial and technical contributions allows us to analyse the relationship between political survival and contributions to UNEP through various hypotheses. Even though it is impossible to completely rule out alternative explanations such as legitimacy-seeking, the overall results can still indicate whether or not domestic political survival is (among) the main explanations behind state contributions to UNEP.

Conceptualization

Before trying to answer the research question, it is crucial to clearly define the main concepts. In this research, there are three main concepts: domestic winning coalition size, global environmental public goods, and state contribution.

The first concept that needs conceptualization is winning coalition size. In selectorate theory, there are two relevant political groups. The first is the selectorate, this is the group of people with some say in choosing the leader (for example voters in a democracy). The second is the winning coalition. The winning coalition is a subset of the selectorate and is the group of people the leader actually needs to stay in office, for example, a majority of voters in a democracy or a much smaller group of (military) supporters in a dictatorship (Bueno de Mesquita et al., 2003, pp. 41-43). Therefore, the size of the winning coalition of a leader is the number of supporters he needs to survive relative to the population.

Secondly, the concept of global environmental public good needs elaboration. Following the economic literature, global public goods are defined as goods that are non-excludable, non-rivalrous, and if provided, available worldwide (Uitto, 2016, pp. 108-109). Moreover, all global public goods that directly contribute to preventing further or restoring current environmental degradation fall within the category of global environmental public goods (Uitto, 2016, pp. 108-109). The main examples are climate change mitigation and protection and restoration of biodiversity.

Finally, it is necessary to define what is meant by states contributing to these global environmental public goods. This research focuses on contributions of states to the United Nations Environmental Programme (UNEP). UNEP is widely seen as the most relevant intergovernmental organization for coordinating global environmental policies and is therefore an appropriate case for this research (Ivanova, 2010). Moreover, the focus will be

on both financial and technical contributions. For financial contribution, contributions to UNEP's Environment Fund will be used because, unlike contributions to the Earmarked Fund, these are direct contributions to UNEP's ability to provide global environmental public goods (United Nations Environment Programme, n. d.-b). For technical contributions, the focus is on membership of the Committee of Permanent Representatives since this committee provides most of the technical assistance for the General Assembly of UNEP (United Nations Environment Programme, n. d.-b). Finally, the data for the year 2018 is used, because 2018 is the most recent year that was not (strongly) defined by a major international political and/or economic crisis such as the COVID-19 pandemic in the years after or the sovereign debt crisis in the years before 2018.

Hypotheses

As already discussed, the main idea is that leaders with large winning coalitions value the (global) public goods produced by intergovernmental organizations more, because they need them for satisfying their winning coalition. As a consequence, states with large winning coalitions should be more willing to use resources for creating and sustaining the intergovernmental organizations necessary for producing the global public good (Bueno de Mesquita et al., 2003, pp. 41-43). Therefore, the expectation is that states with very large winning coalitions are most likely to, and states with very small winning coalitions are least likely to contribute to UNEP. In the case of technical support, the focus is on membership of the Committee of Permanent Representatives. The first hypothesis, therefore, is:

H1: *The larger the domestic winning coalition, the more likely it is for states to be a member of the Committee of Permanent Representatives of UNEP*.

The same logic should also apply to financial contributions to UNEP. Moreover, the theory predicts that this relationship should also be present in relative terms with states with larger winning coalitions contributing relatively more (Bueno de Mesquita et al., 2003, pp. 41-43). Therefore, the second and third hypotheses are:

H2: *The larger the domestic winning coalition, the more likely it is for states to make financial contributions to UNEP*.

H3: *The larger the domestic winning coalition, the relatively larger the financial contribution of states to UNEP*.

Methodology

To answer the research question, it is necessary to test to what extent the independent variable explains the variation in the dependent variable. Since the independent variable, winning coalition size, is measured on a continuous scale, a single-n or small-n study is not an appropriate method. For example, with a two-case study, it would be possible to compare two extreme cases, but that would not provide evidence about the effect of smaller changes on this continuous scale. Only a large-n study, with as many states as possible included, can analyse the full effect of this continuous variable (Field, 2018, pp. 48-54). Therefore, this research will use a large-n study. Moreover, to make an analysis of so many states possible, statistical methods are used.

For the first and second hypotheses, a logistic regression model will be used. A logistic regression model makes it possible to analyse how differences in the size of the winning coalition make it more or less likely for states to contribute (Field, 2018, pp. 879-885). In this model, the independent variable is winning coalition size. The dependent variable is the contribution of states to UNEP, either technical or financial, coded as a dummy variable with 0 standing for not contributing and 1 standing for contributing.

For the third hypothesis, a linear regression model will be used (Field, 2018, pp. 372-375). The linear regression model calculates to what extent differences in the winning coalition size explain the variation in the relative financial contribution of states (Field, 2018, p. 375). In this model, the independent variable is still winning coalition size. The dependent variable is the financial contribution of states made to UNEP as measured in US dollars (USD). Moreover, to make the data comparable, the contribution per capita in USD is used.

Finally, the models described above will be run both with and without control variables. The use of control variables makes it possible to rule out some of the most obvious alternative explanations. Following the literature on selectorate theory and the literature on international environmental cooperation, GDP per capita, regime durability, climate change vulnerability, foreign direct investment, and GDP growth will be used as control variables.

Data

Finally, before running the statistical models described above, data is necessary for the variables involved. In a previous section, the variables were conceptualized, and it is

important to use measurements that are as similar to these conceptualizations as possible. An overview of all variables is provided in table 1 below.

Table 1. Summary of variables in the analysis.

Variable	Type	Description
W-size	Independent	Relative size of the domestic winning coalition
CPR_member	Dependent	Membership of the Committee of Permanent Representatives (yes/no)
Fin_absolute	Dependent	Financially contributing to UNEP (yes/no)
Fin_relative	Dependent	Financial contribution per capita
GDP_capita	Control	Gross domestic product per capita
Reg_durability	Control	Durability of regime's authority pattern
Climate_risk	Control	Vulnerability to climate change
FDI	Control	Level of foreign direct investment
GDP_growth	Control	Average annual rate of change in the gross domestic product

The independent variable, (domestic) winning coalition size (*W-size*), is conceptualized as the relative size of the group of essential supports of a political leader. This conceptualization closely follows this concept in selectorate theory and it is, therefore, possible to use the data used by scholars of this theory. The scholars Bruce Bueno de Mesquita and Alastair Smith have created two such datasets. The first one was used in 2003 when introducing selectorate theory and includes data up to 1999 (Harvard Dataverse, 2007). However, the measure of the winning coalition was criticized for being too crude and failing to differentiate between policy options in the wide range of non-democratic states (Gallagher & Hanson, 2015; Kennedy, 2009). Incorporating much of the criticism, a second dataset for the variable winning coalition was published in 2022 (Bueno de Mesquita & Alastair, 2022). In this dataset, the (relative) size of the winning coalition is calculated using institutional variables of the V-Dem dataset. Besides, this dataset includes data up to 2020. In this research, the second dataset will be used because this revised version incorporates much of the criticism on the first one and contains data up to 2020 instead of 1999 (Harvard Dataverse, 2022).

The dependent variable, state contribution to global environmental public goods, is conceptualized as financial and technical contributions of states to UNEP. On the technical side, the focus is on membership of the Committee of Permanent Representatives. This is measured by the variable *CPR_member* which codes members 1 and non-members 0. The necessary data is downloaded from the website of UNEP (United Nations Environment Programme, n. d.-d). On the financial side, the focus is both on contributing or not and relative contributions. As discussed under conceptualization, the focus is solely on financial contributions to the Environment Fund. The first variable is measured by the variable *Fin_ab*solute. This is a dummy variable with states financially contributing coded as 1 and those not contributing coded as 0. The second variable is *Fin_relative* measuring the relative financial contribution of states by dividing the contribution, measured in USD, by the population size. Data for both variables are obtained from the UNEP site (United Nations Environment Programme, n. d.-e).

Finally, to make the cases more comparable and to take into account some alternative explanations, the following control variables are used. To take into account differences in wealth level, the variable *GDP_capita* is included. It is necessary to control for wealth level because it is not illogical that wealthier states will be more willing to contribute or contribute relatively more. The necessary data are obtained from the World Bank (n. d.-c) World Development Statistics dataset. Furthermore, the variable *Reg_durability* is included. There is a considerable time difference between the investment in a (new) global public good and the actual provision of the good. Therefore, the expectation is that leaders will only invest in global public goods when the regime is durable enough (Cao & Ward, 2015, p. 265). The *Reg_durability* variable measures how durable regimes are. For data, the regime durability measure of the Polity IV dataset is used (Polity Project, 2014). Moreover, it is necessary to take into account other benefits. The focus of this research is on environmental public goods of which climate change mitigation is perhaps the most prominent. Since not all states have the same exposure to climate change, there is also a difference in the benefits states receive when this global public good is provided. To take into account this difference, the variable *Climate_risk* is added. Based on the Global Climate Risk Index of Germanwatch, the variable measures how vulnerable states are to climate-related risks (Germanwatch, n. d.). Furthermore, the variable *FDI* is included to account for different levels of foreign direct investment. It is expected that states that attract a lot of foreign direct investment are more internationally oriented and therefore more willing to participate in international cooperation

efforts. The data are obtained from the World Bank (n. d.-a). Finally, the variable *GDP_growth* is included. GDP growth generally corresponds with environmental degradation. It is therefore argued that states with high growth levels are less willing to contribute to global environmental public goods because that would negatively impact their growth (Cao & Ward, 2015, p. 270). Again, the necessary data are obtained from the World Bank (n. d.-b).

Analysis and Results

In this section, the results of the analysis for all three hypotheses are discussed, starting with the likelihood of membership of the Committee of Permanent Representatives. In each case, the regression model is first run with only winning coalition size as independent variable (model 1) and then again also including the control variables discussed above (model 2). In total, the analysis included 173 states. However, due to missing values for states in one or more of the variables, the models effectively include between 72 and 150 states. The models are run using IBM SPSS Statistics. The SPSS output can be found in appendix B. Moreover, the relevant assumption tests were run for each model. A discussion of the various results and the explanation for various data transformations can be found in appendix A.

Logistic regression model of the Committee of Permanent Representatives

Following the first hypothesis, the first statistical model analysed to what extent winning coalition size can predict the likelihood of membership of UNEP's Committee of Permanent Representatives. The results of the logistic regression model are summarized in table 2.

Table 2. Logistic regression model of winning coalition size on membership of the Committee of Permanent Representatives of UNEP.

	Model 1	Model 2
(Constant)	-0.178	1.780
	(0.660)	(1.069)
W_size	1.475	0.528
	(0.924)	(1.198)
Climate_risk		-0.024***
		(0.007)
GDP_capita		0.000***
		(0.000)
Reg_durability		0.007
		(0.011)
FDI		-0.101*
		(0.054)
GDP_growth		-0.017
		(0.178)
-2LL	180.718	147.276
Cox and Snell's R^2	0.017	0.213
Nagelkerke's R^2	0.024	0.302
N	150	150

Note: binary logistic regression coefficients with standard errors in brackets.
***p < 0.001, **p < 0.01, *p < 0.05

As mentioned, model 1 includes only winning coalition size while model 2 also includes the five control variables. Both models include 150 of the original 173 cases. To start with model 1, the results show that winning coalition size does not have a significant effect on the dependent variable. However, it should be noted that the significance value of the variable is 0.111 which still comes quite close to being significant, especially since many scholars also include a 10% significance level. Moreover, the effect direction is positive, meaning that the larger the winning coalitions, the more likely it is for states to be a member of the Committee of Permanent Representatives. Therefore, the effect direction corresponds to the expectation. Having said that, the two measures for R^2 show that the explanatory power of this model is

quite low. Even with Nagelkerke's R^2, the model only explains 2.4% of the variance in the dependent variable.

The inclusion of control variables in model 2 does not make the influence of winning coalition size significant. In fact, its significance score gets much lower. However, the effect direction remains similar and still confirms the expectation. Furthermore, the second model has a much higher explanatory power than the first one. The two measures of R^2 show that the model explains between the 21.3% and 30.3% of the variance in the membership of the Committee of Permanent Representatives. Moreover, vulnerability to climate change, GDP per capita and foreign direct investment all have a significant influence. The first two even at the 0.1% level. It is, however, surprising that both vulnerability to climate change and foreign direct investment have, against the expectation, a negative impact. In the case of climate change vulnerability, one possible explanation could be that states most vulnerable to climate change are often very small states that may not have the resources to contribute (World Bank, 2022). For foreign direct investment, the effect of FDI on international openness may simply not manifest itself in the form of membership of technical committees.

All in all, at best there is weak evidence for the hypothesis that domestic coalition size influences the likelihood of states to become a member of the Committee of Permanent Representatives. In both models, the effect direction corresponds to the expectation, but the effect itself is insignificant.

Logistic regression model of financial contributions of states

The second hypothesis predicts that the larger the winning coalition size of states, the more likely it is that the state contributes financially to UNEP. This expectation is tested using a logistic regression model of which the results are summarized below in table 3.

Table 3. Logistic regression model of winning coalition size on financial contributions of states to UNEP.

	Model 1	Model 2
(Constant)	-1.636	-2.805**
	(0.689)	(1.060)
W_size	2.237*	1.253
	(0.937)	(1.090)
Climate_risk		-0.005
		(0.006)
GDP_capita		0.000***
		(0.000)
Reg_durability		0.013
		(0.010)
FDI		0.007
		(0.034)
GDP_growth		0.214*
		(0.060)
-2LL	198.919	158.626
Cox and Snell's R^2	0.041	0.269
Nagelkerke's R^2	0.054	0.359
N	148	148

Note: binary logistic regression coefficients with standard errors in brackets.
***p < 0.001, **p < 0.01, *p < 0.05

Again model 1 only includes winning coalition size while model 2 also includes the control variables. These models include a total of 148 states. In the first model, the influence of domestic winning coalition size on financial contribution is significant at the 5% level. In fact, with the significance score being 0.017, it is even almost significant at the 1% level. Moreover, the effect direction is again positive, demonstrating that larger winning coalition sizes are, as predicted, associated with a higher probability of making financial contributions. However, the explanatory power of the model is still a bit on the low side as shown by the two R^2 measures. These measures show that the model only explains between 4.1% and 5.4% of the variance in the dependent variable.

Model 1 shows a significant relationship, however, it is necessary to see if this relationship remains significant, and if not, how it changes, when more possible explanatory variables are included. Therefore, model 2 also includes the five control variables. Importantly, the inclusion of control variables changes the impact of winning coalition size and makes it insignificant. No matter this change, the effect direction remains similar and still confirms the expectation of the hypothesis. Besides, the explanatory power of model 2 is again much higher than that of model 1. The R^2 measures show that the model explains between 26.9% and 35.9% of the variance in the financial contribution variable, which is quite high. Nevertheless, only two of the five control variables have a significant influence on the dependent variable. Again, GDP per capita is significant at the 0.1% level. Furthermore, GDP growth has a significant impact at the 5% level. Surprisingly, the effect direction of GDP growth is positive, meaning that higher growth is associated with a higher probability of financially contributing, which is opposite the expectation. This could be explained by pointing out that high-growth states also see an increase in government revenues, which increases the ability of states to contribute (Das, 2019).

To sum up, the models found a significant relationship, working in the expected direction, between domestic winning coalition size and the probability that states make financial contributions to UNEP. But the significance disappears once the five control variables were added. The effect direction remains as expected. Therefore, even though the models provide some evidence that supports the hypothesis, the evidence is not conclusive.

Linear regression model of relative financial contributions of states

Finally, the third hypothesis predicts that the larger the domestic winning coalition of a state, the more the state will relatively contribute, in financial terms, to UNEP. In this case, a linear regression model is used to investigate the relationship. The results of this analysis are summarized in table 4.

Table 4. Linear regression model of winning coalition size on the relative financial contributions of states to UNEP.

	Model 1	Model 2
(Constant)	-2.384*	-3.404***
	(1.021)	(0.771)
W_size	5.455***	3.690***
	(1.326)	(0.711)
Climate_risk		0.016*
		(0.004)
GDP_capita		0.000***
		(0.000)
Reg_durability		0.011*
		(0.005)
FDI		-0.010
		(0.015)
GDP_growth		-0.247*
		(0.077)
R^2	0.195	0.804
Adj. R^2	0.183	0.786
N	72	72

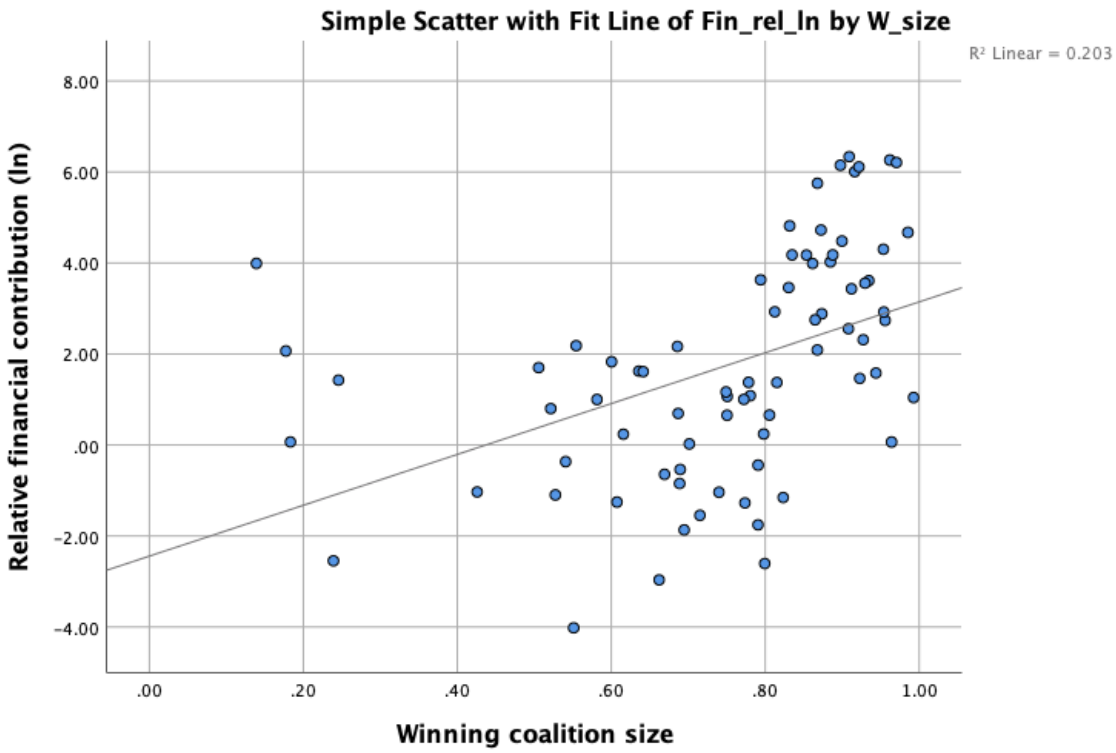
Note: OLS regression coefficients with standard errors in brackets.
***p < 0.001, **p < 0.01, *p < 0.05

At first, this model was run with all states, with those not contributing coded with a value of zero. However, this led to problems with normality and homoscedasticity. After a logarithmic transformation with added values, to still include not-contributing states, did not sufficiently solve these problems. The analysis was run with the logarithmic transformed values of only those states contributing. This model did solve the described problems. A more detailed description of this process can be found in appendix A. Important to note is that the results of the various models were very similar and all highly significant.

As a result of the modification described above, the analysis only includes 72 states. To start with model 1, without the control variables domestic winning coalition size has a significant influence on the relative financial contributions of states to UNEP. In fact, it is even

significant at the 0.1% level. Furthermore, just like in the first two analyses, the effect direction is positive and, therefore, corresponds to the expectation of the hypothesis. On top of that, the R^2 and the adjusted R^2 both show that winning coalition size is quite a powerful predictor. Both measures show that the variable explains almost 20% of the variance in the relative financial contributions of states. Finally, this relationship can also be visualized. Figure 1 shows a scatterplot of the logarithmic transformed relative financial contributions plotted against the domestic winning coalition size. Even though there are some outliers, the figure and the fit line clearly show a positive, linear relationship between the two variables. Moreover, confirming the expectation, the figure shows that only a small number of states with a small domestic winning coalition make financial contributions to UNEP.

Figure 1. Simple scatterplot with fit line of relative financial contributions over winning coalition size.



Again, because the relationship found is significant, it is important to see whether this relationship remains significant when including more explanatory variables and if not, how it changes. Model 2, that includes the five control variables, shows that the influence of domestic winning coalition size on the dependent variable is still significant. Adding the control variables also did not change the significance level. Besides, the effect direction,

being positive, still confirms to the expectation of the hypothesis. The addition of the control variables also improved the explanatory power of the model. The R^2 and the adjusted R^2 show that the model explains between 78.6% and 80.4% of the variance in the relative financial contributions of states to UNEP, which is very high. In this model, besides winning coalition size, also the control variables climate risk, GDP per capita, regime durability and GDP growth are significant. All at the 5% level, except GDP per capita which is again significant at the 0.1% level. Moreover, the effect direction of all significant control variables confirms to the expectation.

Altogether, the results provide strong support for the hypothesis that domestic winning coalition size has a significant influence on the relative financial contribution states make to UNEP. Both with and without the control variables, the influence of winning coalition size is highly significant and, in both cases, the effect direction corresponds to the expectation of the hypothesis.

Conclusion

This research aimed to answer the following question: What is the influence of domestic winning coalition size on the contribution of states to global environmental public goods? Using three hypotheses, focussing on different ways in which states contribute to UNEP, this research has tried to answer the question.

Altogether, the statistical models found moderate support for the expectation that the larger the domestic winning coalition of a state, the more likely it is that the state will contribute and, if contributing, the relatively more the state will contribute to UNEP. In all models, both with and without control variables, the effect direction confirmed this expectation. Moreover, all models without control variables found a significant or almost significant relationship between the two variables. However, when including the control variables, only the relative financial contribution of states remained (highly) significant. Therefore, all models confirm the direction of the relationship, however, the relationship is only significant when contributions are measured with relative instead of dichotomous variables. To conclude, even though not all results are conclusive, this research has provided evidence that the size of the domestic winning coalition of leaders has a positive effect on the contribution of states to global (environmental) public goods.

Limitations

However, it is important to acknowledge the limitations of this research. First of all, even though, theoretically speaking, the contribution of states to intergovernmental organizations is a good measure, it still only measures a small part of the contributions states make to global public goods. By solely focussing on this measure, some dynamics may be overlooked by this study. Secondly, global environmental public goods are taken as a representative example of global public goods in general. When focussing on the characteristics of global public goods, this is justifiable. However, there may be other variables that interfere with this generalization. For example, as discussed, there is relatively much media attention and social pressure for global environmental public goods. Finally, as discussed in the results section, the explanatory power of winning coalition size is quite low in some models. This indicates that there are other reasons that influence the decisions of political leaders and, in some cases, there may be better explanatory variables. For example, research shows that legitimacy-seeking also strongly influences (some) of these decisions (Simmons, 2009). Having said that, selectorate theory also does not claim that it can explain everything nor that winning coalition size is the only relevant variable.

As a result of these limitations, more research is necessary to fully understand the implications of this study and to give a more decisive answer to the questions this study tried to contribute to. First of all, it would be useful to conduct a study focussing on a specific, yet as representative as possible, global (environmental) public good. For example, a narrow focus on climate change mitigation could allow a small N-study to use more qualitative methods, possibly content analysis, to analyse the relationship between winning coalition size and the motivation behind domestic contributions of states to the provision of this specific global public good. The results of such a study could further reinforce the findings of this study. Secondly, having concluded that winning coalition size only explains parts of the variance in state contributions, it is useful to investigate how political survival considerations work together with other explanations. In particular, the combination of domestic political survival and legitimacy-seeking is interesting for global public goods.

Implications

Nevertheless, despite the limitations described above, the findings of this research have important implications both for the academic fields of international relations and international political economy as well as for society. To start with the academic fields, the findings of this research provide additional support for selectorate theory. Even though not all findings were significant, they all confirmed the expected direction of the effect, and the most sophisticated model, focusing on the relative financial contributions of states, did find a highly significant relationship. In total, the research provides new evidence that political survival considerations of state leaders are associated with many economic outcomes and provides the first evidence that it also influences the provision of global public goods. Furthermore, through the focus on domestic coalitions, the findings contribute to the major debate in international political economy about the influence of regime type on economic outcomes (Mansfield, Milner & Rosendorff, 2002, p. 477). Finally, through the focus on intergovernmental organizations, this research has introduced a new explanation, supported by some evidence, for the creation and especially the financing of these organizations, thereby also contributing to a major debate in international relations (Schweller & Priess, 1997).

The findings also have important practical and social implications. Most importantly, this research has provided a comprehensive theoretical framework for explaining the financing of global public goods. Even though more research is necessary to further develop this theoretical framework, it already provides a good and clear starting point for the development of new strategies to improve the provision of global public goods. In particular, the detailed explanation of selectorate theory about the reasoning of state leaders can help design strategies aimed at changing leaders' incentives. For example, linking promised contributions from states more directly to state leaders' survival can make these agreements more credible and thus reduce (some) cooperation problems. Furthermore, strategies designed to change the incentives of members of the winning coalition about global public goods can force leaders to contribute more to these goods. Specifically, these results are applicable to global environmental public goods. Again, these new insights into the importance of winning coalitions and political survival could help negotiators at future United Nations Climate Change Conferences (COPs) develop better negotiating strategies and build more credible and robust agreements on, for example, combating climate change.

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Appendix A

In this appendix, the results for all the relevant assumption tests for the statistical models used are summarized and discussed. In some cases, various versions of the same analysis are discussed to explain how problems with underlying assumptions were solved.

1 Logistic regression model of the Committee of Permanent Representatives

Assumption of no-influential cases

The first assumption that requires some investigation, is the assumption that there are no cases that significantly change the regression coefficients, so-called influential cases. To see if there are influential cases in this research, the Cook's distance measure is used. Since the maximum value of Cook's distance is < 1, there is no indication of influential cases.

	N	Minimum	Maximum	Mean	Std. deviation
Cook's distance	150	,00000	,57796	,0465118	,083009820

Assumption of outliers

Outliers are cases that deviate very strongly from the main pattern in the data, and can therefore influence the outcome. There is a problem with outliers if more than 5% of all standardized residuals have a score > 1.96 or < -1.96. Since the table shows that this percentage is 4%, there is no problem of outliers.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	,00	144	83.2	96.0	96.0
	1,00	6	3.5	4,0	100,0
	Total	150	86.7	100,0	
Missing	System	23	13.3		
	Total	173	100.0		

Outliers with ZRE > 1.96 or < -1.96.

Assumption of multicollinearity

Finally, it is necessary to analyze if the independent variables are not too strongly correlated. This can be done using the VIF and Tolerance-statistics. Unfortunately, SPSS does not provide the option to calculate these statistics with a binary logistic regression model. Therefore, a linear regression model was created to obtain these statistics. There is a problem of multicollinearity if there are VIF-values > 5, if the average of the VIF-values is > 2, or if there are Tolerance-values < 0.2. None of this is the case, see table below, so there is no problem of multicollinearity.

Coefficients			
		Collinearity Statistics	
Model		Tolerance	VIF
1	W_size	1.000	1.000
2	W_size	.920	1.087
	Climate_risk	.933	1.072
	GDP_capita	.548	1.825
	Reg_durability	.579	1.727
	GDP_growth	.968	1.033
	FDI	.918	1.090

2 Logistic regression model of financial contributions

Assumption of no-influential cases

Using Cook's distance, we can determine if there are influential cases. Since the maximum value of Cook's distance is < 1, there are no influential cases.

	N	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
Cook's distance	150	,00000	,57796	,0465118	,083009820

Assumption of outliers

Using the standardized residuals, we can see how many outliers there are. Since the percentage outliers, see below, is < 5%, there is no violation of this assumption.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	,00	142	82.1	95.9	95.9
	1,00	6	3.5	4,1	100,0
	Total	148	85.5	100,0	
Missing	System	25	14.5		
	Total	173	100.0		

Outliers with ZRE > 1.96 or < -1.96.

Assumption of multicollinearity

Again, a linear regression model was made for obtaining the collinearity statistics. Since none of the VIF-values was > 5, none of the Tolerance-values was < 0.2, and the average of the VIF-values was not > 2, there is no indication that this assumption was violated.

Coefficients			
		Collinearity Statistics	
Model		Tolerance	VIF
1	W_size	1.000	1.000
2	W_size	.915	1.093
	Climate_risk	.927	1.079
	GDP_capita	.545	1.834
	Reg_durability	.579	1.727
	GDP_growth	.968	1.033
	FDI	.919	1.088

3 Linear regression model of relative financial contributions

3.1 Baseline model

The results below show that there is a (relatively) small violation of the normality assumption and a much more worrisome violation of the homoskedasticity assumption. Therefore, some transformation of the variables is required to make the results more robust. Important to note is that in this 'baseline model', winning coalition has, both with and without control variables, a significant effect in the expected direction on the relative financial contributions of states (see 'Coefficients').

Assumption of no-influential cases

Again, it is necessary to see whether or not there are influential cases. As shown in the table, there are no cases with a Cook's distance value > 1, and therefore, there are no influential cases.

	N	Minimum	Maximum	Mean	Std. deviation
Cook's distance	148	,00000	,63907	,0164232	,06901062

Assumption of no-outliers

To see if outliers are a problem in this research, it was analyzed how large percentage of the standardized residuals had a value above 1.96 or below -1.96. As indicated in the table below, this percentage is below the 5%, leading to the conclusion that there is no problem of outliers.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	,00	142	82.1	95.9	95.9
	1,00	6	3.5	4,1	100,0
	Total	148	85.5	100,0	
Missing	System	25	14.5		
	Total	173	100.0		

Outliers with ZRE > 1.96 or < -1.96.

Assumption of independent errors

This assumption is violated with autocorrelation or the situation where the values of the same variable are correlated across observations. In this case, this assumption is not violated since the result of the Durbin-Watson test is > 1 and < 3.

Model Summary

Model	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
1	.303	.092	.086	95.67396	
2	.699	.489	.467	73.05879	1.872

Assumption of multicollinearity

There is no violation of the multicollinearity assumption since all VIF-values are < 5 and the mean is < 2. Moreover, the Tolerance measure confirms this since none of the values is < 0.2.

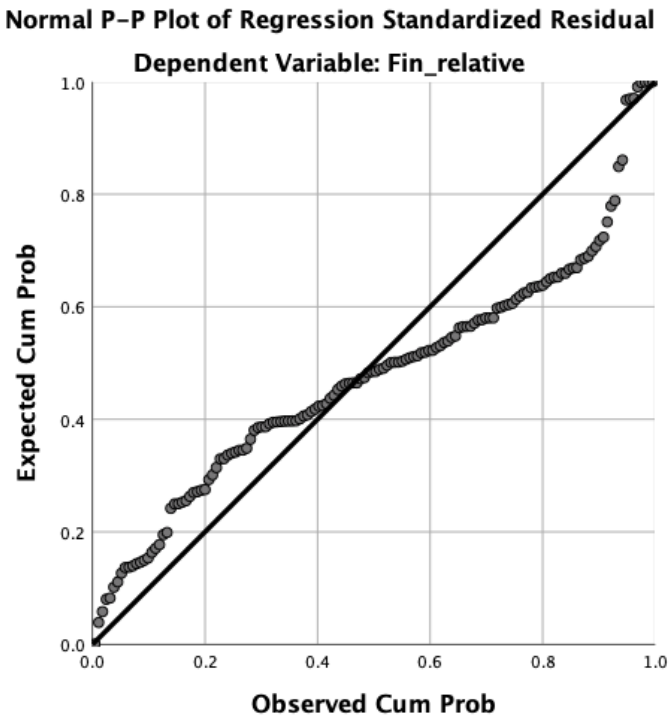
Coefficients

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-82.738	30.199		-2.740	.007		
	W_size	159.149	41.421	.303	3.842	.000	1.000	1.000
2	(Constant)	-70.731	29.901		-2.365	.019		
	W_size	74.490	33.066	.142	2.253	.026	.915	1.093
	Climate_risk	.126	.188	.042	.669	.505	.927	1.079
	GDP_capita	.002	.000	.332	4.075	.000	.545	1.834
	Reg_durability	.601	.258	.185	2.332	.021	.579	1.727

GDP_growth	-.807	2.266	-.022	-.356	.722	.968	1.033
FDI	-4.438	.850	-.328	-5.220	.000	.919	1.088

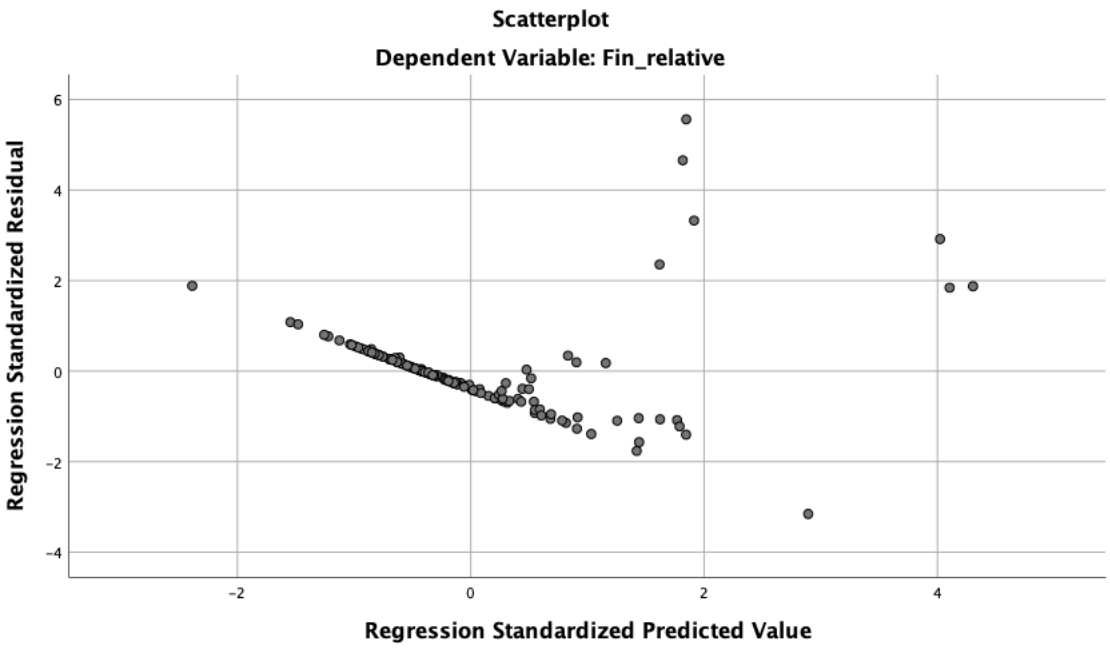
Assumption of normality

The closer the points follow the line, the less indication there is for a violation of the normality assumption. In this case, the points do roughly follow the upward line, but there is still quite some variation. Therefore, it is possible that this assumption is somewhat violated.



Assumption of homoskedasticity

The homoskedasticity assumption assumes that the variance of the dependent variable is the same for all data. Therefore, the graph should indicate a random cloud of dots. In the graph below, this is obviously not the case since many values are closely centered in a downward line. Therefore, we have to conclude that this assumption is violated.



3.2 Model with ln() transformation with added values

To overcome the (small) violation of linearity and the much stronger violation of the homogeneity assumption, the dependent variable (fin_relative) was transformed using a logarithmic transformation. Moreover, to make sure that the zero-values were not deleted, the constant '10' was added to each value. The results below show two important things. Firstly, even though the exact values changed, the effect direction and significance of W-size remain similar or the significance even increases (model 2). Secondly, very little changes with the assumption tests. The violations present in the previous analysis remain, even though the violation of the homoscedasticity assumption becomes less severe.

<u>Assumption of no-influential cases</u>

Again, the analysis of influential cases, using Cook's distance, shows that there is no problem with influential cases since the maximum value of Cook's distance is well below 1.

	N	Minimum	Maximum	Mean	Std. deviation
Cook's distance	148	,00000	,47908	,025080	,04818634

Assumption of no-outliers

Different from the first analysis is that in this case, there is a problem with outliers. As shown in the table, the percentage of standardized residuals with a value > 1.96 or < -1.96 is higher than 5%.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	,00	138	79.8	93.2	93.2
	1,00	10	5.8	6.8	100,0
	Total	148	85.5	100,0	
Missing	System	25	14.5		
	Total	173	100.0		

Outliers with ZRE > 1.96 or < -1.96.

Assumption of independent errors

Again, the score of the Durbin-Watson test is > 1 and < 3, indicating that there is no problematic autocorrelation.

Model Summary					
Model	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
1	.377	.142	.136	.89021	
2	.804	.646	.631	.58173	1.756

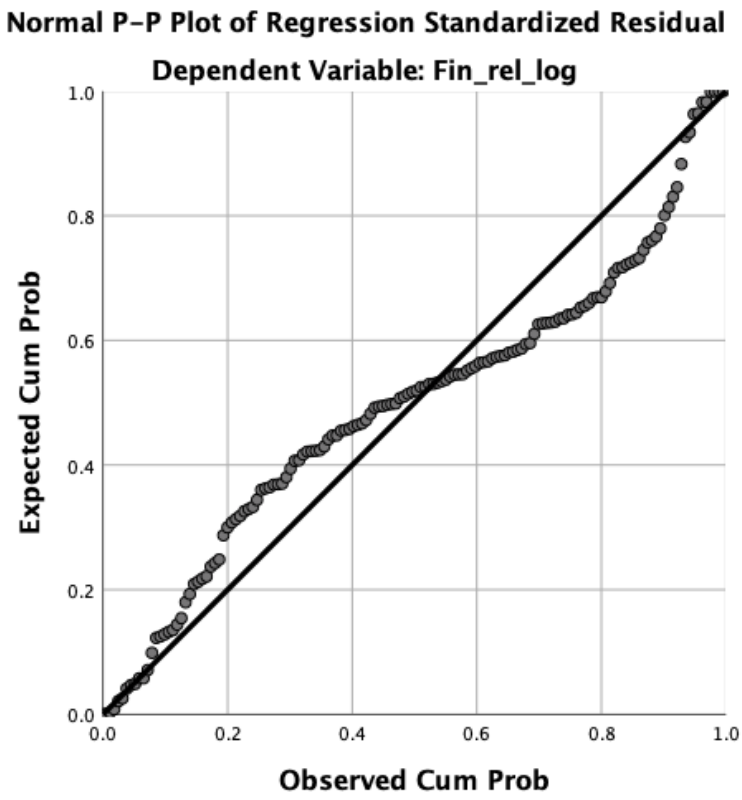
Assumption of multicollinearity

Since all VIF-values are < 5, the mean of the VIF-values is < 2, and there are no Tolerance-values < 0.2, there is no reason to assume that the assumption of collinearity is violated.

Coefficients								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.432	.281		5.095	.000		
	W_size	1.895	.385	.377	4.918	.000	1.000	1.000
2	(Constant)	1.373	.238		5.768	.000		
	W_size	.990	.263	.197	3.761	.000	.915	1.093
	Climate_risk	.001	.001	.026	.506	.614	.927	1.079
	GDP_capita	.000	.000	.508	7.496	.000	.545	1.834
	Reg_durability	.007	.002	.211	3.200	.002	.579	1.727
	GDP_growth	.004	.018	.011	.219	.827	.968	1.033
	FDI	-.023	.007	-.180	-3.449	.001	.919	1.088

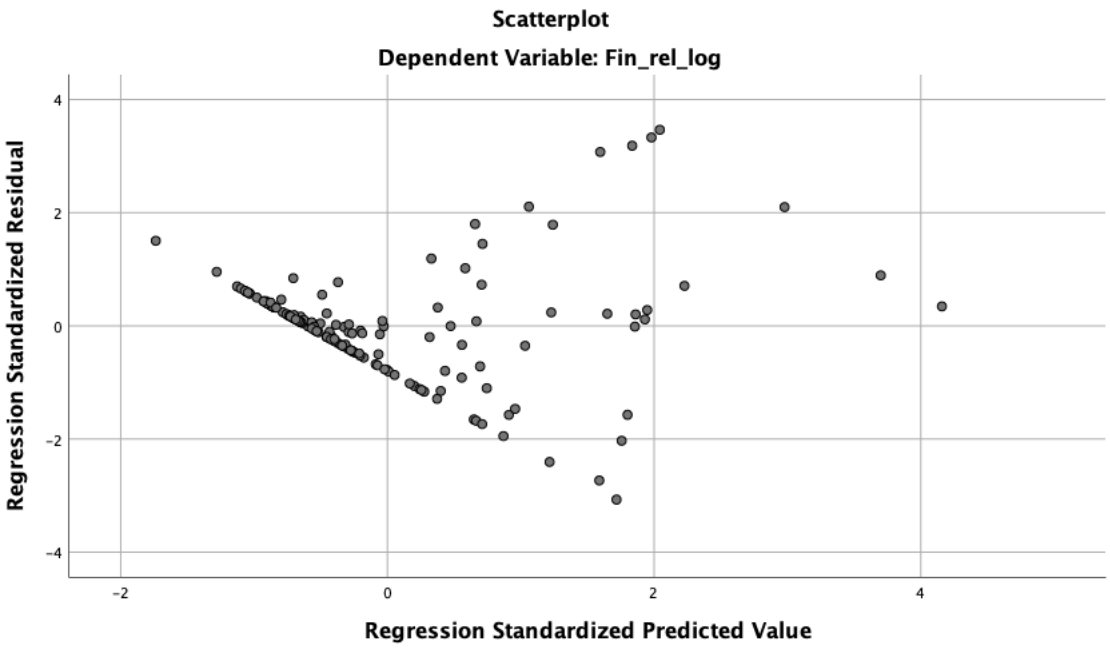
Assumption of normality

As already mentioned above, the transformation had relatively little effect on the violated assumptions. The graph below shows that there is quite some variation around the straight-line, meaning that this assumption could still be, somewhat, violated.



Assumption of homoskedasticity

The graph below shows that the transformation had some effect on the violation of the homoskedasticity assumption. Compared to the first one, this graph shows more randomly positioned dots. However, there is still a clear line in the bottom-left corner. Therefore, the transformation has not (completely) solved the violation.



3.3 Model with ln() transformation without added values

Since the logarithmic transformation with an added constant did not (sufficiently) solve the violations in the normality and homoscedasticity assumptions, it was chosen to again use a logarithmic transformation but this time without the added constant. As a result of using this technique, all zero-values, indicating that a state did not financially contribute, were deleted. Instead, the analysis was run with only the transformed values of the states that did contribute. Consequently, the N became much lower and the analysis no longer took not-contributing states into account. However, the analysis did look into the relationship between the size of the domestic winning coalition of a contributing state and the relative contribution made by that state. Therefore, the analysis is still useful and appropriate for testing the hypothesis.

Below, the results of the necessary assumption tests are summarized and discussed in more detail. In short, the analysis led to two important conclusions. First of all, none of the assumptions was violated in this analysis. The logarithmic transformation was successful in solving the previous problems with normality and homoskedasticity. Secondly, even though the exact numbers are of course different, the results in this analysis correspond to the results found in the other analyses. Again, winning coalition size is highly significant, both with and without control variables, and the effect size is as expected.

Assumption of no-influential cases

Using Cook's distance, the table below shows that there is no problem of influential cases. The maximum value of Cook's distance is well below 1.

	N	Minimum	Maximum	Mean	Std. deviation
Cook's distance	72	,00000	,54754	,0260645	,07471240

Assumption of no-outliers

To check for outliers, the standardized residuals were used. The table indicates that the percentage of outliers is < 5%, leading to the conclusion that the number of outliers is not problematic.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	,00	69	39.9	95.8	95.8
	1,00	3	1.7	4.2	100,0
	Total	72	41.6	100,0	
Missing	System	101	58.4		
	Total	173	100.0		

Outliers with ZRE > 1.96 or < -1.96.

Assumption of independent errors

Using the Durbin-Watson test, it is possible to look for autocorrelation. Since the value is > 1 and < 3, there is no indication of autocorrelation.

Model Summary					
Model	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
1	.441	.195	.183	2.26293	
2	.897	.804	.789	1.15855	2.356

Assumption of multicollinearity

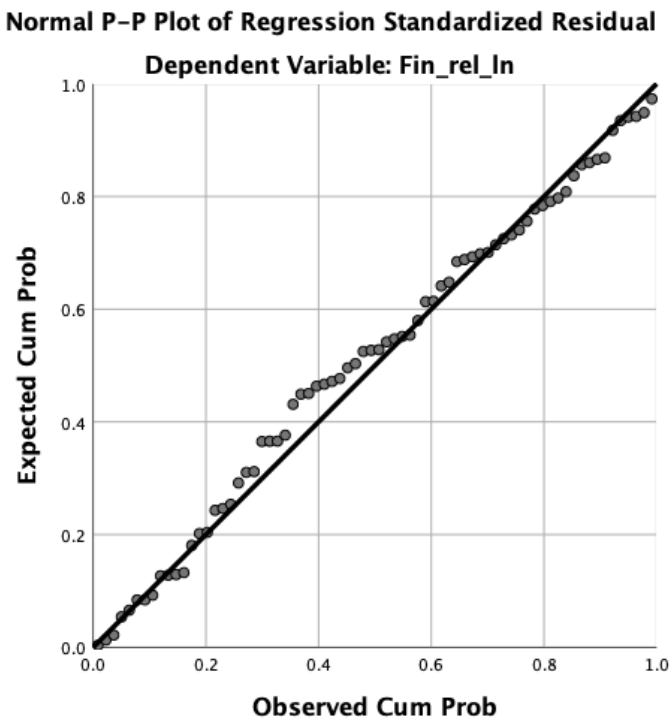
The VIF and Tolerance-statistics indicate whether there is reason to worry about multicollinearity. In this case, there are no VIF-values > 5 and the mean of all VIF-values is below 2, meaning that there are no worrisome VIF-statistics. Furthermore, the Tolerance-statistics lead to the same conclusion since none of the Tolerance-values is < 0.2.

Coefficients

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-2.384	1.021		-2.335	.022		
	W_size	5.455	1.326	.441	4.113	.000	1.000	1.000
2	(Constant)	-3.404	.771		-4.414	.000		
	W_size	3.690	.711	.298	5.191	.000	.913	1.095
	Climate_risk	.016	.004	.210	3.609	.001	.888	1.126
	GDP_capita	.000	.000	.518	7.135	.000	.572	1.747
	Reg_durability	.011	.005	.157	2.268	.027	.632	1.583
	GDP_growth	-.247	.077	-.194	-3.230	.002	.835	1.198
	FDI	-.010	.015	-.040	-.678	.500	.885	1.130

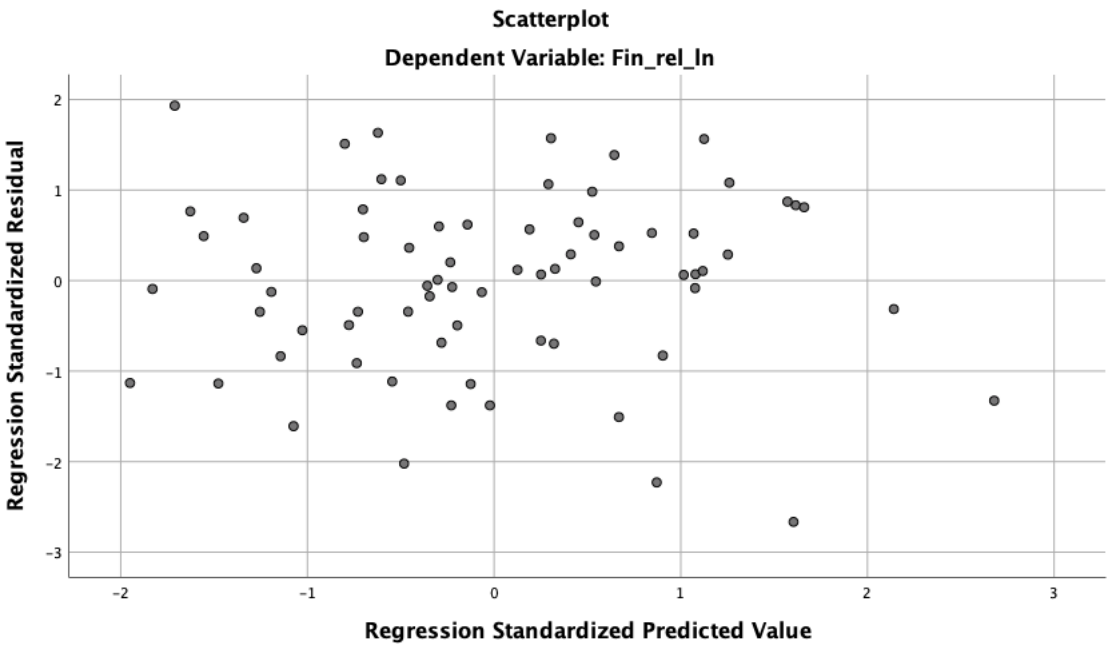
Assumption of normality

The normal P-P plot below shows the observed cumulative distribution plotted against the theoretical, or observed, cumulative probability distribution. The graph shows that all dots follow the straight-line closely, in contrast to previous plots, thereby demonstrating that there is no problem of normality.



Assumption of homoskedasticity

Finally, the homoskedasticity assumption requires further investigation. In the previous models, this was the most problematic assumption. However, the scatterplot shows that the data transformation was successful. The dots are spread randomly and there is no observable pattern, meaning that the data is homoscedastic.


Scatterplot
Dependent Variable: Fin_rel_ln
Regression Standardized Residual
Regression Standardized Predicted Value
2
1
0
−1
−2
−3
−2
−1
0
1
2
3

Appendix B

In this appendix, the SPSS code used for creating the statistical models described above is listed. Moreover, the appendix includes pictures of the dataset.

1 Logistic regression model of the Committee of Permanent Representatives

```
LOGISTIC REGRESSION VARIABLES CPR_member
/METHOD=ENTER W_size
/METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
/SAVE=COOK ZRESID
/CLASSPLOT
/CASEWISE OUTLIER(2)
/PRINT=GOODFIT CORR
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

DESCRIPTIVES VARIABLES=COO_1
/STATISTICS=MEAN STDDEV MIN MAX.

COMPUTE ZRE_concern_1=ZRE_1 > 1.96 | ZRE_1 <  - 1.96
EXECUTE.

FREQUENCIES VARIABLES=ZRE_concern_1
/ORDER=ANALYSIS.

REGRESSION
/MISSING LISTWISE
/STATISTICS COLLIN TOL
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT CPR_member
/METHOD=ENTER W_size
/METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
/SCATTERPLOT=(*ZRESID ,*ZPRED).
```

2 Logistic regression model of financial contributions

```
LOGISTIC REGRESSION VARIABLES Fin absolute
/METHOD=ENTER W_size
/METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
/SAVE=COOK ZRESID
/CLASSPLOT
/CASEWISE OUTLIER(2)
/PRINT=GOODFIT CORR
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

```
DESCRIPTIVES VARIABLES=COO_1
/STATISTICS=MEAN STDDEV MIN MAX.

COMPUTE ZRE_concern_1=ZRE_1 > 1.96 | ZRE_1 <  - 1.96
EXECUTE.

FREQUENCIES VARIABLES=ZRE_concern_1
/ORDER=ANALYSIS.

REGRESSION
/MISSING LISTWISE
/STATISTICS COLLIN TOL
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT Fin_absolute
/METHOD=ENTER W_size
/METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth
FDI/SCATTERPLOT=(*ZRESID ,*ZPRED).
```

3 Linear regression model of relative financial contributions

3.1 Baseline model

```
DATASET ACTIVATE DataSet1.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Fin relative
  /METHOD=ENTER W_size
  /METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(2)
/SAVE COOK LEVER.

DESCRIPTIVES VARIABLES=COO_1
/STATISTICS=MEAN STDDEV MIN MAX.

COMPUTE ZRE_concern_1=ZRE_1 > 1.96 | ZRE_1< -1.96.
EXECUTE.

FREQUENCIES VARIABLES=ZRE_concern_1
/ORDER=ANALYSIS.
```

3.2 Model with ln() transformation with added values

```
COMPUTE Fin_rel_new=Fin relative + 10.
EXECUTE.

COMPUTE Fin_rel_log=LN(Fin_rel_new).
EXECUTE.

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Fin_rel_log
  /METHOD=ENTER W_size
  /METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(2)
  /SAVE COOK LEVER.

DESCRIPTIVES VARIABLES=COO_1
  /STATISTICS=MEAN STDDEV MIN MAX.

COMPUTE ZRE_concern_1=ZRE_1 > 1.96 | ZRE_1< -1.96.
EXECUTE.

FREQUENCIES VARIABLES=ZRE_concern_1
  /ORDER=ANALYSIS.
```

3.3 Model with ln() transformation without added values

```
COMPUTE Fin_rel_ln=LN(Fin relative).
EXECUTE.

REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Fin_rel_ln
  /METHOD=ENTER W_size
  /METHOD=ENTER Climate_risk GDP_capita Reg_durability GDP_growth FDI
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(2)
  /SAVE COOK LEVER ZRESID.

DESCRIPTIVES VARIABLES=COO_1
  /STATISTICS=MEAN STDDEV MIN MAX
```

```
COMPUTE ZRE_concern_1=ZRE_1 > 1.96 | ZRE_1 <  - 1.96.
EXECUTE.

FREQUENCIES VARIABLES=ZRE_concern_1
  /ORDER=ANALYSIS.
```

4 Graph of Figure 1

```
GGRAPH
/GRAPHDATASET NAME="graphdataset" VARIABLES=W_size Fin_rel_ln
MISSING=LISTWISE REPORTMISSING=NO
/GRAPHSPEC SOURCE=INLINE
/FITLINE TOTAL=YES
/COLORCYCLE COLOR1(85,150,230), COLOR2(215,0,51), COLOR3(41,134,38),
COLOR4(243,103,42),
COLOR5(227,215,16), COLOR6(0,180,160), COLOR7(255,196,226),
COLOR8(171,73,243), COLOR9(95,195,56),
COLOR10(63,90,168), COLOR11(254,130,180), COLOR12(208,202,140),
COLOR13(204,134,63),
COLOR14(119,55,143), COLOR15(236,230,208), COLOR16(69,70,71),
COLOR17(92,202,136),
COLOR18(208,83,52), COLOR19(204,127,228), COLOR20(225,188,29),
COLOR21(237,75,75),
COLOR22(28,205,205), COLOR23(92,113,72), COLOR24(225,139,14),
COLOR25(9,38,114),
COLOR26(90,100,94), COLOR27(155,0,0), COLOR28(207,172,227),
COLOR29(150,145,145),
COLOR30(63,235,124)
/FRAME OUTER=NO INNER=NO
/GRIDLINES XAXIS=YES YAXIS=YES
BEGIN GPL
SOURCE: s=userSource(id("graphdataset"))
DATA: W_size=col(source(s), name("W_size"))
DATA: Fin_rel_ln=col(source(s), name("Fin_rel_ln"))
GUIDE: axis(dim(1), label("Winning coalition size"))
GUIDE: axis(dim(2), label("Relative financial contribution (ln)"))
GUIDE: text.title(label("Simple Scatter with Fit Line of Fin_rel_ln by W_size"))
ELEMENT: point(position(W_size*Fin_rel_ln))
END GPL.
```

5 Overview of the dataset

5.1 Variable view

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	country_name	String	32	0		None	None	10	Left	Nominal	Input
2	iso3c	String	3	0		None	None	7	Left	Nominal	Input
3	W_size	Numeric	8	2		None	None	8	Right	Scale	Input
4	CPR_member	Numeric	8	2		None	None	8	Right	Nominal	Input
5	Fin_relative	Numeric	8	2		None	None	8	Right	Scale	Input
6	Fin_absolute	Numeric	8	2		None	None	8	Right	Ordinal	Input
7	Contribution	Numeric	8	2		None	None	8	Right	Scale	Input
8	Population	Numeric	8	2		None	None	12	Right	Scale	Input
9	Climate_risk	Numeric	8	2		None	None	8	Right	Scale	Input
10	GDP_capita	Numeric	8	2		None	None	8	Right	Scale	Input
11	Reg_durability	Numeric	8	0		None	None	8	Right	Scale	Input
12	GDP_growth	Numeric	8	2		None	None	8	Right	Scale	Input
13	FDI	Numeric	22	0		None	None	8	Right	Scale	Input
14	Fin_rel_new	Numeric	8	2		None	None	13	Right	Scale	Input
15	Fin_rel_log	Numeric	8	2		None	None	13	Right	Scale	Input
16	Fin_rel_ln	Numeric	8	2		None	None	12	Right	Scale	Input
17											

5.2 Data view

	country_name	iso3c	W_size	CPR_member	Fin_relative	Fin_absolute	Contribution	Population	Climate_risk	GDP_capita	Reg_durability	GDP_growth	FDI	Fin_rel_new	Fin_rel_log	Fin_rel_ln
39	Czech Republic	CZE	.86	1.00	53.91	1.00	573100.00	10629928.00	92.83	39932.99	25	3.20	3	63.91	4.16	3.99
40	Democratic R...	COD	.57	1.00	.00	.00	.00	84068092.00	58.67	1085.89	2	5.82	3	10.00	2.30	.
41	Denmark	DNK	.94	1.00	.00	.00	.00	5793636.00	75.50	56281.29	73	1.99	2	10.00	2.30	.
42	Djibouti	DJI	.52	1.00	.00	.00	.00	958923.00	73.00	5214.07	19	8.41	6	10.00	2.30	.
43	Dominican Re...	DOM	.75	.00	.00	.00	.00	10627147.00	118.00	17711.80	22	6.98	3	10.00	2.30	.
44	Ecuador	ECU	.73	1.00	.00	.00	.00	17084359.00	103.83	11561.75	18	1.29	1	10.00	2.30	.
45	Egypt	EGY	.41	1.00	.00	.00	.00	98423602.00	102.00	11366.34	5	5.31	3	10.00	2.30	.
46	El Salvador	SLV	.78	1.00	2.95	1.00	18970.00	6420740.00	91.83	8614.02	34	2.43	2	12.95	2.56	1.08
47	Equatorial Gu...	GNQ	.47	.00	.00	.00	.00	1308966.00	.	20386.01	49	-6.24	3	10.00	2.30	.
48	Eritrea	ERI	.27	1.00	.00	.00	.00	.	118.00	.	25	.	.	10.00	2.30	.
49	Estonia	EST	.92	1.00	4.33	1.00	5718.50	1321977.00	75.67	35208.02	18	4.13	4	14.33	2.66	1.46
50	Eswatini	SWZ	.25	.00	.00	.00	.00	1136274.00	118.00	8520.59	45	2.37	1	10.00	2.30	.
51	Ethiopia	ETH	.57	1.00	.00	.00	.00	109224410.00	69.33	2103.52	0	6.82	4	10.00	2.30	.
52	Fiji	FJI	.64	1.00	5.07	1.00	4481.00	883490.00	73.00	13846.16	4	3.81	8	15.07	2.71	1.62
53	Finland	FIN	.87	1.00	314.55	1.00	1734900.00	5515525.00	97.83	48130.29	74	1.14	-4	324.55	5.78	5.75
54	France	FRA	.87	1.00	112.52	1.00	7550550.00	67101930.00	52.50	45251.91	49	1.87	3	122.52	4.81	4.72
55	Gabon	GAB	.52	1.00	.00	.00	.00	2119275.00	118.00	14744.43	9	.84	8	10.00	2.30	.
56	Georgia	GEO	.75	.00	2.91	1.00	10840.00	3726549.00	93.17	14253.41	27	4.84	7	12.91	2.56	1.07
57	Germany	DEU	.99	1.00	106.83	1.00	8857041.90	82905782.00	61.33	53463.40	28	1.09	4	116.83	4.76	4.67
58	Ghana	GHA	.79	1.00	.00	.00	.00	29767108.00	53.33	5177.88	17	6.20	4	10.00	2.30	.
59	Greece	GRC	.95	1.00	.00	.00	.00	10732882.00	45.00	29150.69	43	1.67	2	10.00	2.30	.
60	Guatemala	GTM	.77	.00	.00	.00	.00	16346950.00	65.67	8462.17	22	3.32	1	10.00	2.30	.
61	Guinea	GIN	.62	1.00	.00	.00	.00	12414292.00	99.17	2499.71	5	6.36	3	10.00	2.30	.
62	Guinea-Bissau	GNB	.72	.00	.00	.00	.00	1874304.00	118.00	1901.93	4	1.28	1	10.00	2.30	.
63	Guyana	GUY	.80	.00	1.27	1.00	992.74	779007.00	118.00	12477.58	26	4.44	25	11.27	2.42	.24
64	Haiti	HTI	.76	.00	.00	.00	.00	11123183.00	58.33	2992.31	1	1.67	1	10.00	2.30	