Conventional Arms Control Agreements in Europe: Conditions of Success and Failure

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Abstract

Under what conditions are adversarial conventional arms control agreements (CAC) in Europe successful or unsuccessful? This study aims to identify the conjunctural causes of conventional arms control success in Europe from the end of World War One to the present based on a dataset of 22 cases. It applies a qualitative comparative analysis (QCA) to assess arms control success and failure resulting from four conditions: great power rivalry, national limitations, demilitarisation and delegation. Few studies have attempted to determine if CAC agreements in Europe have been successful and determine possible explanations for their outcome. This study's results suggest that national limitations between great power rivals and the absence of delegation with great power rivalry are more likely to result in agreement failure. Delegation may be important for agreement success when great powers or buffer zones are involved. These findings offer insights for future CAC agreements in Europe.

Keywords: conventional arms control, war causation, qualitative comparative analysis (QCA), great power rivalry, delegation

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Introduction

Under what conditions are adversarial conventional arms control (CAC) agreements[1] in Europe successful or unsuccessful? This research question, largely neglected in the scholarly literature, is of paramount importance for several reasons. First, the current Russia-Ukraine war is due in large part to the failure of CAC agreements, with the failure coming from a combination of insufficient existing agreements and the inability to revise them, and failure to establish new agreements – both pathways that Russia sought from the end of the Cold War through the start of the Russia-Ukraine war (Lippert 2024a). Second, when success contributes to preventing wars and agreement failure contributes to conflict, answering this research question contributes to causes-of-war scholarship (Fearon 1995; Jervis 1991, 2017; Lebow 2010; Vasquez 1996).

While the definition of conventional arms (Conventional Arms n.d.) is broadly accepted, arms control has different meanings in different contexts. Larsen (2002: 1) defines arms control as 'any agreement among states to regulate some aspect of their military capability or potential'. Kühn (2020a) uses the term 'cooperative arms control' between adversaries, but includes confidence and security building measures (CSBMs) in his definition, which this article excludes. This study focuses on CAC agreements in Europe which incorporate a legally binding limitation on some aspect(s) of military capabilities and are an agreement between rivals or geopolitical competitors. This excludes agreements such as export controls, non-proliferation of weapons of mass destruction and universal, humanitarian restrictions.[2]

With a great power rivalry now settling upon Europe and with the goal of assisting practitioners in mitigating this and to increase scholars' understanding of peace and security in Europe, this study focuses on CAC in Europe because of its 'specific European historical-political setting' (Kühn 2020a: 33). This article is relevant to scholars because it attempts to answer questions that are rarely asked: when is a CAC agreement successful, and what conditions lead to success or failure?

For this study, Europe is broadly defined as a space composed of states from the North Atlantic to the Urals. It thus includes Russia, but excludes, for example, Central Asia. Moreover, this article includes NATO and all its members (including the US and Canada) as European actors due to the high level of involvement in European security. In particular, the US has been critical for influencing security in Europe since WWI.[3]

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1   Unless otherwise stated, all mentions of CAC in this article refer to adversarial agreements.
2   Examples of these include the Wassenaar Arrangement, Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the Anti-Personnel Landmines Convention, respectively.
3   This differs from Kühn's (2020a) definition of Europe, which includes all OSCE members. This study does not include, for example, agreements between Armenia and Azerbaijan as their dispute is regional and the states straddle west Asia and southeast

This article uses a unique set of 22 CAC agreements from the end of WWI to the present, many of which are typically not considered in the existing arms control literature. Table 1 (see the section on research design and dataset below) includes all of these agreements as well as their long and abbreviated names. The 22 CAC agreements are analysed with a Qualitative Comparative Analysis (QCA)[4] with four conditions[5]: delegation, national limitations, geographic demilitarisation and great power rivalry involvement, to assess multicausal pathways and success or failure of CAC agreements. This research method provides insights into how the conditions may interact with one another and lead to agreement success or failure.

This study's agreements are focused on Europe for several reasons. First, the overlapping system of organisations such as the Organization for Security and Cooperation (OSCE), the European Union (EU) and NATO that are likely to have roles in any post-war CAC agreement share similar cultures and common history which excludes states and institutions outside of Europe (Sommerer & Tallberg 2019). Second, even CAC agreements which are products of UN support, such as the United Nations Peacekeeping Force in Cyprus (UNFICYP) and the establishment of the Kosovo Force (KFOR) which was one of the two parties of the 1999 Kosovo agreement, were established or supported by the United Nations Security Council (UNSC) whose Permanent 5 are composed of three European powers and the US. Prior to the United Nations (UN), the League of Nations, which was dominated by European states, was involved in several of the interwar CAC agreements, such as the Åland Islands Convention and the Lausanne Convention for the Straits. Third, several CAC agreements in Europe are interconnected (Anthony & Kane 2016; van Ham 2018). For example, the London Naval Treaties were based on the Washington Naval Treaties accomplishments; the Conventional Armed Forces in Europe (CFE) Treaty unwound because the 1999 Adapted CFE (A/CFE) Treaty did not enter into force; the 1990 Final Settlement for Germany specifically references the then-forthcoming CFE Treaty; and the Balkans CAC agreement is based on the CFE Treaty. Many European CAC agreements are either modelled after previous agreements, or formally connected. Treaties from other global regions are not included in this dataset because they have minimal or no connection to European institutions,

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Europe. For the most part their conflict does not involve core European interests. This contrasts with the Russo-Georgian conflict which involved at least one clearly European state (Russia), and some have suggested it involved broader European issues such as NATO and EU membership.

4   While some scholars specify whether a crisp-set (cs) or fuzzy-set (fs) QCA method is used, this article drops the description as csQCA is another form of fsQCA.

5   In QCA, what is commonly referred to as an independent variable in correlational studies is called a condition, due to the Boolean set-based rather than correlational nature of the analysis.

European CAC histories and experiences, and there is a comparative dearth of such agreements.

This study's set-theoretic-based QCA analysis of the 22-CAC case dataset has attempted to identify which combinations of conditions may be more likely to lead to CAC agreement success or failure. The study supports two of the hypotheses: first, that the combination of great power rivalries and quantitative limits on states' national military capabilities are a pathway to agreement failure; and second, that the *absence* of delegation to international organisations and agreement executors in combination with the presence of great power rivalries may lead to agreement failure. The study did not uphold the hypotheses that success pathways included the combination of delegation to agreement executors with geographic demilitarisation; or the delegation to agreement executors amidst great power rivalries although these combinations do appear in the data.

This article begins with an introduction, and then offers a discussion of the purposes and characteristics of CAC agreements. It then delves into greater detail about how great powers impact CAC agreements and three important aspects of CAC agreements. Thereafter, the study's QCA methodology is presented and discussed, followed by an overview of the research design which presents how the concepts of delegation, national limitations, geographic demilitarisation and great power rivalries are calibrated and analysed with QCA. This leads to a discussion of the calculated results from the perspectives of agreement success and absence of agreement success.[6] The results are then interpreted and analysed, followed by a conclusion to summarise the article.

Conventional arms control agreements: approaches and conditions

Adversarial CAC agreements' goals are to formally stabilise relationships with specific and detailed limitations which fix the status quo whether between states' national military capabilities or in a specific geographic area with the agreements enforced through some level of monitoring, verification and dispute resolution (Burns & Urquidi 1968; Hastedt & Eksterowicz 1988). This contrasts with arms control agreements which aim to reduce proliferation, usually related to weapons of mass destruction (WMD) or for humanitarian purposes to reduce the impact and severity of conflict. These types of agreements impose restrictions between allies and adversaries alike.

While CAC agreements may result in a reduction in the relative military balance, it never reverses it. In stabilising military rivalries (or at least attempting to do so), states seek to improve their diplomatic relations because the agreements reduce dispute causes and sources of tension such as fears of surprise attacks and contests over strategic locations (Freedman 1991; Lachowski 2010).

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6   For brevity and readability, hereafter 'absence of success' is shortened to 'failure'.

The alternatives to CAC agreements include arms racing, deepening competition and conflict.

In addition to the status quo, deterrence is an underlying factor for CAC. States or alliances seek to retain or improve their deterrence (if they possess it) and can do so at a lower cost with CAC. In relationships in which there is parity or near parity, CAC agreements will preserve deterrence while reducing 'offensive' threats. However, in cases in which only one side has deterrence, such as a greatly imbalanced relationship in peacetime or following a major military victor/defeat, the strong party will seek to retain their deterrence by imposing limits on the defeated party.

Conventional arms control: agreement success

This study's QCA outcome or dependent variable is the presence or failure of success. Scholars are far from unanimous in viewing CAC or arms control agreements more generally as beneficial or positive. Fatton (2016) considers them broadly impotent in resolving existing adversarial relations and Gray (1993) does not believe that they contribute to peace and that they have a poor record of accomplishment. Indeed, he goes further to state that arms control efforts can even be counter-productive, especially for democracies that might disarm themselves in the face of predatory states (Jervis 1991). Kühn (2020a) and Graef (2021) view them as potentially more beneficial but note a significant downturn in their utility and effectiveness in the past few decades. Schofield (2000) is less critical of arms control but observes that they do a poor job at addressing deeper problems, particularly contests over the balance of power and adapting to changes in the balance of power which may be resolved through conflict.

Tanner is very sceptical of post-conflict arms control based on his analysis of case studies, stating that 'in asymmetrical outcomes, the chances for lasting arms agreements are almost nil'. One reason he identifies is the 'absence of normative consensus among the parties engaged in the construction of post- war structure' (Tanner 1993: 40). Here he is referring to the lack of a consensus of how post-conflict arms control should be approached and that each new post-conflict arms control regime is started from scratch, and he also assesses that post-conflict arms control agreements are more focused on ending the war than creating a stable post-war regime. At the same time, Tanner's sweeping scepticism of post-conflict CAC agreements may be unwarranted, as he may be basing his analysis on a small case selection.

Armistices and ceasefires are generally narrower agreements to terminate a conflict intended to create breathing room for a broader, longer-lasting peace. As such, CAC agreements related to armistices are intended to prevent a resumption of conflict, including accidental, by decreasing the opportunities for attacks and the exchange of fire. Fortna (2004: 210) also states that narrow cease-fire agree-

ments and agreements that only deal with arms control 'do not help maintain the peace'. Rather, broader measures including third-party guarantees, peacekeeping and intensified diplomatic efforts contribute to a more durable peace.

Studying CAC agreements and their success or failure is an approach, and arguably an underused one, to understand the causes of war. While other approaches, as Fortna (2004: 39) phrases it, struggle to determine when leaders 'go to peace', CAC agreements offer an insightful method of seeing when leaders go to peace (or stay at peace) – as these agreements are often specifically intended to maintain or establish peace – or states abandon the agreements and go to war.

Overall, the scholarship on CAC agreements is more negative than positive in judging its outcome. CAC agreements attempt to lock a status quo into place, but struggle to evolve when the status quo changes. For this reason, states withdraw or defect to change the status quo when they are dissatisfied – especially when defeated states believe that they can overturn the conditions of defeat – or because the status quo changed due to other reasons. At the same time, and here the scholarship is underwhelming, states in CAC agreements may largely be satisfied with the status quo and retain the agreements. They may either feel that the present agreement is sufficient and satisfies their security needs, or that even if it is insufficient, attempts to change the status quo may not end in their favour (Bull 1976; Schofield 2000). Nonetheless, though most scholars are sceptical of CAC agreement outcomes, none have attempted to explain under what combination of conditions they fail.

Great powers

Rivalries and conflicts in Europe since the beginning of the 20th century have often involved great powers. On the one hand, great powers compete across a range of issues and geographic space and possess a broader and more substantial range of military capabilities. As a result, they may be more likely to clash and conflict (Lynch III & Hoffman 2020).

Yet great powers may pursue CAC agreements for several reasons even while they aim to retain deterrence. Great power rivals find themselves in perpetual, long-term competitions defined in part by perceptions of zero-sum stakes. Thus, they are continuously concerned with relative gains and losses, complicating cooperation. At the same time, cooperation – as arms control scholars have continuously noted in prisoner dilemma models – can result in net gains for both (Downs, Rocke & Siverson 1985; Fearon 1998; Kydd 2000). The challenge, however, is assessing that an adversary will comply with any agreement and that for both sides cooperation outweighs defection. As Downs et al note, 'the long-run advantages of cooperation … [may] pale before the benefits of victory or the cost of defeat' (Downs, Rocke & Barsoom 1996).

Nonetheless, great powers have a self-interest in peacetime CAC to not just preserve resources through reduced expenditures but in preventing conflicts

whose outcomes are not guaranteed to improve their standing and the status quo. When great powers are victorious in a conflict – whether against other great powers or not – they have an interest in locking in their superiority and preventing defeated states from seeking revenge (Lebow 2010).

The impact of great power rivalries or their absence on CAC agreements is not discussed in detail in the existing literature. Rather, most of the CAC or general adversarial arms control in Europe literature focuses on great power rivalries whether between the US/NATO and Russia/Soviet Union/Warsaw Pact, or prior to the Cold War, between great powers such as the UK, France and Germany.

While CAC agreements may even substantially limit great powers' military capability, enough capability may remain – especially when limits are even – for one side to concentrate enough forces to attack (Biddle et al. 1991). This threat alone may weaken CAC agreements over time, especially if diplomatic relations have not improved even while the agreement itself is technically respected. Similarly, changes in technology, increases in military capabilities even in treaty limited equipment (TLE), within legal limits, can result in perceived or actual changes in the military balance (Lippert 2024b). Great powers may be more able to take advantage of opportunities to increase their relative military strength of TLE due to possessing greater resources compared to non-great powers.

These issues undermine efforts to mitigate the security dilemma as great powers are more likely to have larger militaries with a greater variety of capabilities, making assessment of comparative strengths and weaknesses difficult, even with the transparency and controls offered by CAC (Kaplow & Gartzke 2021; Lebow 2010).

Unless a CAC agreement as well as other policies result in resolving the rivalry between great powers, they are likely to still seek to prevail in the rivalry despite the negative impact on the stability offered by CAC agreements (Mazarr et al. 2021: 37) which will lead to, among other outcomes, violating or renouncing the CAC agreement. With multi-domain, rivalry-driven competition, rivals are compelled to pursue gains in zero-sum competitions due to the phenomenon of cumulative, relative gains (Mathews III 1996). A party that sees its relative strength decreasing due to the other's relative gains may be more likely to abandon CAC agreements even when they are being fully respected. One of Russia's concerns, for example, with the CAC regime that was designed and implemented prior to NATO expansion, was the loss of what they considered to be 'indivisible security' – NATO's gains in military capability was Russia's loss (Kvartalnov 2021).

Assessing the differences in rivalries and conflicts between great power and non-great power adversaries or rivals is beyond this study's scope,[7] but I offer a

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7 Interstate adversarial relationships may be categorised into great power vs great power, great power vs non-great power, and non-great power vs non-great power. Mazarr makes the case that an adversarial relationship between a great power and non-great

few observations on why great power rivalries may impact the success or failure of CAC agreements. First, great powers may have more venues to compete and assess their relative strengths and weaknesses. As Jervis (2017: 64) notes, 'Any [great power] that has interests throughout the world cannot avoid possessing the power to menace others.' As to the extent to which a CAC is intended to address the military balance and offer avenues for improving diplomatic relations, this may be more difficult between great powers. For example, restrictions on naval forces in the inter-war years did little to alleviate issues of land power competition or attempts to broadly expand territory even if not at the cost of other great powers. Moreover, competing great powers may still engage in indirect conflict through proxy wars, which non-great powers may be less able to wage.

National limitations

One the methods to stabilise security relationships between rivals, whether great powers or not, is to set limitations on equipment quantity in national inventories. Reducing the quantity and/or capabilities of conventional weapons can halt arms racing either in those weapon classes or overall (Downs, Rocke & Siverson 1985), and may decrease the likelihood of surprise attacks when the TLE focus on perceived offensive weapons (Leah 2015; Webster 2004). The limits are in part based on the notion that an attacking force can gain a decisive advantage by amassing a high ratio, sometimes defined as three-to-one (Helmbold 1969), of forces against an adversary's defences. In a mutually balanced agreement, by limiting offensive capabilities while leaving defensive capabilities in place, both sides retain deterrence as neither can amass sufficient forces to conduct a successful surprise attack (NATO 1989; Snyder 1988).

In discriminatory CAC agreements, usually the outcome of a conflict in which one side is a clear victor, the victor may impose limits to ensure their deterrence by both limiting a rival's offensive capabilities, but also by limiting defensive capabilities (deterrence inhibition) so that the victor may successfully attack to enforce terms of the agreement or otherwise contribute to deterrence by ensuring the victor's ability to increase the costs of the defeated state must pay for attacking (Haffa 2018).

There are several challenges with national limitations. First, no agreement can control every aspect of a state's military capabilities. Thus, states may successfully shift their resources to compensate for limitations into different capabilities or capabilities not initially conceived when agreements were made (Lippert 2023, 2024c). Second, national limitation agreements struggle to adjust with changes to

power is not a rivalry, because the non-great power cannot actually compete with the great power. Rivalries and adversarial relationships differ substantially from competitive states which might compete in a number of areas, especially economic, and may have been rivals, but do not view one another as a physical security threat (Mazarr et al. 2021: 9).

the geopolitical status quo, especially alterations in alliance structures and memberships. This was especially true with the CFE Treaty when first the Warsaw Pact dissolved and then several of its members joined NATO.

This would suggest that while great powers may agree to CAC with national limitations, changes over time will disrupt the balance even when all parties are compliant, resulting in states seeking to defect from the agreement. The hypothesis would thus be:

> H1: *Great power and national limits is a pathway to agreement failure.*

Demilitarisation

Another method to stabilise rival security relationships is by limiting military capability in a specific geographic area such as a strip of land along a border or a key geographic feature. Geographic demilitarisation agreements may be made during a time of peace in order to mitigate the security dilemma wherein states do not need to possess the geographic area for their security but their security becomes threatened if a rival possesses it (Schelling 1975). Chillaud (2006: v), when speaking of northern Europe, referred to demilitarisation agreements as an attempt to 'exempt' areas 'from the risks and penalties of interstate warfare'. Examples of these include Norway's Spitsbergen Islands and the Turkish Straits.

More commonly, however, demilitarisation agreements are the product of conflicts. When conflicts terminate, even temporarily, rivals may agree to a demilitarised area or buffer zone to separate the forces and/or limit certain types of weapons within that area 'designed to reduce the risk of or minimise territorial disputes by preventing direct contact between hostile armies' (Chillaud 2006: 6). Sometimes these areas have a third-party presence, such as international peacekeepers, to monitor compliance and record violations.

Because of their narrow scope, demilitarisation may not resolve underlying causes of rivalries because it only resolves a small portion of a rivalry's causes. Most notably it does not substantially decrease the capability of a state to launch a surprise attack as overall capabilities are untouched and thus free to increase without limits. On the other hand, demilitarisation may increase the political cost of defection, especially when third parties including great powers serve as guarantors and/or implementors of demilitarisation agreements. Moreover, demilitarisation agreements can stabilise rivalries if states are satisfied that the status quo is better than continuing a conflict but the inability to come to an agreement on issues such as national boundaries prevents a permanent agreement.

Implementation and delegation

The method of CAC implementation is one of an agreement's more important characteristics. In and of itself, the method of implementation does not reflect

the type of rivalry nor the type of agreement, so that implementation approaches are independent of other agreement traits.

Delegation of authority within a CAC agreement is the extent to which states delegate or share formulation and implementation of a CAC with a third-party state or states or an international body. Delegation is by its nature a surrender of state sovereignty, as a state is entrusting important matters of state security and even existence to another entity. An agreement which lacks any delegation, such as the inter-war naval agreements, means that no implementation body is formed, and that states themselves perform every aspect of monitoring, verification and enforcement (Lippert 2024d).

Some agreements create a weak coordinative body that merely serves as a meeting forum where technical and administrative matters might be discussed, such as the CFE Treaty's Joint Consultative Group (JCG). Still other agreements might have a highly empowered body in which state parties have delegated a substantial amount of authority and responsibility to the treaty executor to include permanent monitoring and verification staff in the area of application, inspection authority and even enforcement authority. Agreement executors with high delegation include the OSCE's Special Monitoring Mission (SMM) in Ukraine and the Allied Control Commissions established in each defeated Axis country during or following WWII.

High implementation delegation to an agreement executor increases the likelihood of agreement success in several ways (Lippert 2024b). First, agreement executors may neutrally conduct activities so that their assessments are perceived as valid not just by the main state parties concerned but by the broader international community, including great powers who may have direct interests – including as formal agreement supporters – in the agreement's success. Second, agreement executors may serve as arbiters of disputes. Third, agreement executors help regularise and normalise positive exchanges and compliance (Fearon 2018). Lastly, defection from an agreement in which there is high delegation may impose higher diplomatic costs than an agreement lacking any third-party participation (Fortna 2004; Werner & Yuen 2005).

Delegation may be especially important to demilitarisation agreements because when, in the case of certain geographic features, states are primarily concerned that their rivals do not possess an area, an agreement executor might objectively and credibly enforce this. In the case of a conflict buffer zone, an agreement executor can maintain a neutral presence and manage the area, raising the cost of violations or defections due to physical presence. This suggests the following hypothesis:

H$_2$: Delegation and demilitarisation is a pathway to agreement success.

Great powers may be especially concerned with cheating, believing that their rivals may seek to obtain relative advantages despite agreements. A treaty executor with high delegation may offset fears of and discourage cheating and defection but lacking high delegation, agreements are more likely to fail. These analyses lead to the following hypotheses:

H_3: The presence of delegation and great power rivalry is a pathway to agreement success.

H_4: The absence of delegation and the presence of great power rivalry is a pathway to agreement failure.

QCA as a research method: general remarks

The CAC dataset is analysed using QCA, a research methodology used to understand and establish set-theoretic connections between the outcome (success) and causal conditions. As Schneider and Wagemann (2012: 8) state, 'Set-theoretic methods operate on membership scores of elements in sets; causal relations are modelled as subset or superset relations. … Set theory can be useful for concept formation, the creation of typologies, and causal analysis.' Set theory is an appropriate approach for studying CAC agreement success because this approach focuses on considering the conditions as unique sets and identifying and analysing to what extent the conditions form sets that are members – or not – of agreement success and its absence (the two possible outcomes). Although QCA is applied extensively in social sciences including international security, it has never been used to assess arms control agreement success.

Truth tables are the foundation of QCA analysis, as they establish the sets and subsets of cases to be analysed and are the 'central features of causal complexity' (Schneider & Wagemann 2012: 9). Truth tables are composed of the cases, conditions and outcomes and are created through logical minimisation. The conditions (in QCA methodology) are the study's dependent variables, and as QCA's goal is to identify pathways through the derivation of the total number of possible conditions, it is counterproductive to have too many conditions as this may expand the number of combinations and pathways, reducing resulting insights (Hirzalla n.d.: 2.2).

In a data table, each case is scored for each condition and outcome with a figure between 0.0 and 1.0, which determines to what extent a case is a member of a condition with 1.0 being fully in and 0.0 being fully out, but QCA calculations do not permit the assignment of a 0.5 value as this does not identify if a value is more in or out of a set. In QCA, calibration is the act of assigning a value to each case's condition. This calibration can be quantitatively deter-

mined, for example by determining that values under a certain range equate to 0.0, then up to a certain range 0.3, in the next range 0.6, and then 1.0; or it can be based on subjective knowledge and judgment when the condition is not quantifiably based (such as level of treaty compliance) although either approach incorporates subjectivity. Conditions may also be limited to a binary option of present (1) or absent (0) when there is no apparent or theoretically comprehensible reason to apply a scale (for example, Böller (2022), when assessing the impact of US presidents on arms control, used binary conditions such as Republican/Democrat and Pre/Post-Cold War).

The outcome is also a set so that the truth table which is generated by the data table states to what extent each case, with each combination of conditions, is a member of which outcome. Thus, QCA allows one to know through a transparent and computer calculated method which case is a member of which condition(s) and outcome(s). This is an insight that a correlational calculation does not offer, as these are bivariate in nature.

QCA is ideally suited for mid-sized case sample sizes and between four to eight conditions (Hirzalla n.d.: 2.2). This method is ideal for understanding and comparing CAC agreements due to the number of cases (22) and their conditions. Equifinality can explain how different combinations of conditions can result in the same outcome. Moreover, QCA enables analysis of sufficiency and necessity. '[A] condition is sufficient if, whenever the condition is present, the outcome is also present. ... A condition is necessary, if, whenever the outcome is present, the condition is also present' (Schneider & Wagemann 2012: 76). A theoretical example of sufficiency might be that whenever US military bases are present in other states, these states always vote pro-US in the UN – but countries without US military bases also vote pro-US. A necessary condition would mean that every state that voted pro-US in the UN also had a US military base but no states without a US base voted pro-US.

Conjunctural causation is another advantage of QCA as it 'draws our attention to the fact that conditions do not necessarily exert their impact on the outcome in isolation from one another, but sometimes have to be combined in order to reveal causal patterns' (Schneider & Wagemann 2012: 90).

Unlike some other methodologies, QCA identifies pathways to outcomes that offer insights into multi-conditional causations in a way that correlational studies do not through analytical interpretation through set relations. QCA seeks to identify commonalities based on condition combinations between cases in a transparent and substantively plausible approach through the generation of outcome configurations, which differs from other methods. However, like other methods, erroneous findings and conclusions can be derived when there are errors in variables (conditions) or data is misinterpreted – including erroneous attribution of relationships to causality. This is where, as with other

methodologies, theoretical knowledge is necessary to interpret data findings (Rutten 2023).

Specialised software or software packages complex assist in the Boolean calculations used to ascertain set membership and pathways. The software calculates consistency, which 'expresses the percentage of cases' set-membership scores', and coverage, which 'assess[es] the relation in size between the condition set and the outcome set' (Schneider & Wagemann 2012: 324–325).

Research design and operationalisation

The following section briefly describes how this study calculated the four conditions and CAC agreement outcome.

Dataset

All of this study's agreements are characterised by mutually agreed, legally binding controls on conventional arms with varying levels of specificity and cover the period from the end of WWI to the 2017 Minsk Agreements (the most recent CAC agreement in Europe at the time of writing). The purpose of *adversarial* CAC agreements (this study's focus) is to stabilise rival relationships rather than deal with other security challenges such as proliferation or the effects of conflict. All of this study's agreements were intended to stabilise relationships by ending or preventing conflict in Europe. Some of these agreements brought an end to combat operations, whether permanent peace agreements or ceasefires while others attempted to remove sources of potential conflict, whether geographic demilitarisation or perceptions of an unstable military balance. Both these types of agreements are included in the same dataset because states seeking to stabilise relationships or terminate conflicts may select from any of the three approaches (conditions), and the presence or absence of a great power rivalry may impact many agreements' aspects of agreements (and the likelihood of their passage).

The 22 CAC agreements, of which 13 are successful, four are unsuccessful and five are partially successful, in this study's dataset fall into two sets of broad categories. First, there are balancing agreements and geographic demilitarisation agreements with minimal overlap across the two (see Table 1). Second, there are post-conflict peace agreements, peace-time balancing agreements, armistices, peacetime geographic demilitarisation agreements and some agreements which fall into an 'other' category. This category's set of agreements have some overlap as, for example, a peace-time balancing agreement can also include geographic demilitarisation. This study analyses the agreements from the perspective of both categories.

Table 1: CAC agreement dataset

Agreement	Abbreviation	Year	Balancing (B) or Demilitarisation (D)	Context Category
1. Post World War One Peace Treaties	WWI	1919	B	Post-conflict
2. The Svalbard (Spitsbergen) Treaty	Spitsbergen	1920	D	Peacetime demilitarisation
3. Finnish-Russian Dorpat/Tartu Agreement	Tartu	1920	B	Discriminatory peacetime
4. Åland Island convention	Åland	1921	D	Peacetime demilitarisation
5. Washington Naval Treaty	WashNav	1922	B	Peacetime balancing
6. Lausanne Agreements of 1923	Lausanne	1923	D	Peacetime demilitarisation
7. London Naval Treaties	LondonNav	1930, 1936	B	Peacetime balancing
8. Anglo-German Naval Treaty	Anglo-German	1935	B	Peacetime balancing
9. Montreux Convention of the Straits	Montreux	1936	D	Peacetime demilitarisation
10. The Moscow Treaty (Finland and Russia) of 1940	Moscow1940	1940	B	Post-conflict
11. Post-World War Two agreements	WWII	1945	B	Post-conflict
12. WEU Protocol for the establishment of the Agency for the Control of Armaments	WEU	1954	B	Post-conflict/peacetime balancing
13. UNSC Cyprus Resolutions, peacekeeping force, and buffer zone creation	Cyprus	1964/1974	D	Cease-fire demilitarisation
14. INF Treaty	INF	1987	B	Peacetime balancing

15. Final Settlement for Germany	Germany1990	1990	B, D	Post-conflict/ demilitarisa- tion
16. CFE Treaty	CFE	1990	B	Peacetime balancing
17. Agreement on the prin- ciples for a peaceful settle- ment of the armed conflict in the Dniester region of the Republic of Moldova	Transdniestria	1992	D	Cease-fire demilitarisa- tion
18. Subregional Arms Con- trol (Balkans)	Balkans	1996	B	Post-conflict balancing
19. Belfast Agreement	Belfast	1998	D	Cease-fire demilitarisa- tion
20. Military Technical Agreement between the International Security Force ('KFOR') and the Gov- ernments of the Federal Republic of Yugoslavia and the Republic of Serbia	Kosovo	1999	B, D	Cease-fire demilitarisa- tion
21. Six-Point Peace Plan for Georgia	Georgia	2008	D	Cease-fire demilitarisa- tion
22. Minsk Agreements	Minsk	2015	D	Cease-fire demilitarisa- tion

Source: Author

CAC agreement success (outcome)

This outcome assesses to what extent a CAC agreement was successful, cali-brated along a score of 0 to 1 (inclusive).[8] While some agreements have been abject failures, lasting less than 10 years and ending when conflict broke out between state parties, and others are successful enough that they are still in place after almost 100 years, many fall in between. They have lasted over 15 years, but then failed because of conflict between state parties; or they have been terminated

8   For more details, see Table 3 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CEJISS_ Online_Appendix_18-3.pdf

due to disputes between state parties who, however, did not go to war against one another. Some agreements may be successful only because they are relatively new, and insufficient time has passed for relations between state parties to deteriorate to the point that the agreements are renounced or the states go to war with one another. Some agreements are, or were, successful except that the state parties went to war with one another, but not over the issue that the agreement addressed. Other agreements such as the post-WWII peace agreements signed between 1943 and 1949 (inclusive) were successful for reasons mostly unrelated to CAC. Similarly, agreements are rarely complete failures. Several agreements endured for at least two decades, though eventually the state parties went to war despite the controls put in place by the agreements.

This article calibrates success based on several factors such as number of years in effect, if the agreement is still being implemented, and if state parties went to war and why.

Delegation

In a study of delegation to CAC agreement executors using a sum-score methodology, the level of delegation was determined by nine different variables which were added up (Lippert 2024b). The total number of points determined the level of delegation. This study uses the sums to determine presence or absence of delegation from a possible low of zero to a high of nine. The calibration for the QCA delegation score is based on the delegation's sum-score.[9]

Nation-wide specific limitations

CAC agreements which incorporate specific, quantitative nation-wide limitations on weapon systems, personnel or other military capabilities are considered in this set (1), while agreements that have no such controls are considered outside of this set (0).[10] The calibration of set membership is straightforward as the inclusion or exclusion of nation-wide military limits is binary amongst the cases.

Geographic demilitarisation

CAC agreements containing geographic demilitarisation, defined by limits or prohibitions on military capabilities within a narrow, specific geographic area, is considered in this set (1), while agreements that lack any geographic demilitari-

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9   For more details, see Table 4 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CEJISS_Online_Appendix_18-3.pdf

10 For more details, see Table 5 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CEJISS_Online_Appendix_18-3.pdf

sation are considered outside of this set (o).[11] The calibration of set membership is straightforward as the inclusion or exclusion of demilitarised areas is binary amongst the cases.

Table 2: Agreement dataset and QCA calibrated values

Short Name	Success	Del	NatLim	Demil	GrtPwr
WWI	0.4	1	1	1	1
Spitsbergen	1	0	0	1	1
Tartu	0.4	0	0	1	0
Åland	1	0	0	1	1
WashNav	0.4	0	1	1	1
Lausanne	1	0.4	0	1	1
LondonNav	0	0	1	0	1
Anglo-German	0	0	1	0	1
Montreux	1	0	0	1	1
Moscow1940	0	0	0	1	0
WWII	1	1	1	1	1
WEU	1	0.7	0	0	0
Cyprus	1	1	0	1	0
INF	0.6	0	1	0	1
Germany1990	1	0	1	1	1
CFE	0.4	0	1	0	1
Transdniestria	1	1	0	1	0
Balkans	1	0.7	1	0	0
Belfast	1	1	0	1	0
Kosovo	1	1	0	1	1
Georgia	1	1	0	1	1
Minsk	0	1	0	1	1

Source: Author

11   For more details, see Table 6 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CEJISS_Online_Appendix_18-3.pdf

Great power rivalry

The calibration for the presence (1) or absence (0) of a great power rivalry first requires the assessment that more than one state party is a great power and then that they have a rivalry either at the time of the agreement's signature or during its entry into force. There is no standard definition of a great power, but this article uses three subjective measures. First, as Mazarr et al. (2021: 5) state, great powers are competitive across a 'global dimension'. Second, the Correlates for the Study of War Composite Indicator of National Capability (CINC) (Greig & Enterline 2021) offers an annual scoring and ranking from the late 18th century to the present so that, in this study's assessment, states in the top fifteen percent can be considered great powers. Lastly, a judgment on whether or not a state is or was a great power is based on historical context. For example, this study does not count interwar Netherlands as a great power despite its possession of colonies worldwide, in part because of its weak national military that was demonstrably and decisively defeated in just four days in 1940.

Rivalry was determined by a combination of historical study, including prior and future conflict, statements made by leaders at that time, a general assessment of diplomatic relations at the time of treaty signature, and an overall assessment of the level and type of strategic competition between great power signatories.[12] The calibration for each condition and outcome (success) are shown in Table 2.

Analytical results

The fsQCA software (fsQCA software version 4.0 for Mac (Ragin & Davey 2022)) calculated three different sets of pathways for each outcome: the complex, intermediate and parsimonious (simple) solution. This study focuses on the intermediate solution, in line with Schneider and Wagemann's recommendation that the intermediate solution provides better insights than the other two solutions (see the supplementary information for the complex and parsimonious solutions) (2012: 175, 278).

One row in both the success and failure truth table is fully contradictory – that is, the exact same conditions result in different outcomes. To an extent, this should be resolved by reassessing their calibration, adding conditions or removing the cases (Hirzalla n.d.: 3.3; Schneider & Wagemann 2012: chap.: 5). However, neither approach seems applicable to the dataset and theoretical approach. Rather, the contradiction provides insights in and of itself. Each truth table also has rows in which the same conditions appear to have different

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12 For more details, see Table 7 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CEJISS_Online_Appendix_18-3.pdf

outcomes, but this is due to the system simplifying truth table scores to 0 or 1 even if the condition value was between these values.

The following two subsections present the results of the analyses for CAC agreements' outcome.

Agreement success

The dataset contains 13 fully successful agreements. The calculations of necessary conditions were all below 0.9, indicating that none of the conditions were necessary for the outcome (success) (Schneider & Wagemann 2012: 278). Table 3 shows the truth table rows for agreement success, with rows 1–4 showing success and 6–9 showing failure. Row 5 is a logical contradiction where the exact same conditions result in both success and failure. This row contains the Kosovo, Georgia and Minsk Agreements which were characterised by the equal values (fully present) of delegation, the absence of national limits, the presence of demilitarisation and the presence of great power rivalry.

The intermediate solution for agreement success is composed of three pathways and is presented in Table 4. It has a consistency of 1.0 for a coverage of 0.53 – meaning that half of the success coverage cases are covered in the three pathways, and that all the cases that are in the pathways have full success. The pathways are:

- Presence of delegation, absence of geographic demilitarisation and absence of great power rivalries; this applies to the Western European Union (WEU) and Balkans agreements.
- Presence of delegation, absence of national limits and absence of great power rivalries; this applies to the Cyprus, Transdniestria, Belfast and WEU cases.
- Absence of delegation, absence of national limits, presence of demilitarisation and presence of great power rivalries; this applies to the Spitsbergen, Åland, Montreux and Lausanne cases.

Absence of agreement success

The dataset contains four agreements where success is fully absent. The calculations of necessary conditions were all below 0.9, indicating that none of the conditions were necessary for the outcome's absence (failure). The absence of delegation appears in both pathways, reflecting its high consistency (0.76) with failure. Table 5 shows the truth table rows for the absence of agreement success, with rows 1–2 showing failure, 3–9 showing the absence of failure (meaning that the outcome was more than 0) and row 5 containing a logical contradiction where the exact same conditions result in both success (1) and failure (0).

Table 3: Truth table for 'success'

	Conditions					Outcome	Consistency			
Row	Del	NatLim	Demil	GrtPwr	Number of cases	Success	raw consist.	PRI consist.	SYM consist.	Cases
1	0	0	1	1	4	1	1	1	1	Spitsbergen, Åland, Lausanne, Montreux
2	1	0	0	1	3	1	1	1	1	Cyprus, Transdniestria, Belfast
3	1	0	0	0	1	1	1	1	1	WEU
4	1	1	0	0	1	1	1	1	1	Balkans
5	1	0	1	1	3	0	0.705882	0.705882	0.705882	Kosovo, Georgia, Minsk
6	0	1	1	1	2	0	0.7	0.625	0.833333	WashNav, Germany1990
7	1	1	1	1	2	0	0.7	0.625	0.833333	WWI, WWII
8	0	1	0	1	4	0	0.25	0.0625	0.083334	LondonNav, Anglo-German, INF, CFE
9	0	0	1	0	2	0	0.2	0	0	Tartu, Moscow1940

Note: Del = delegation; NatLim = National Limitations; Demil = Demilitarized areas; GrtPwr = Great power rivalry; Success = CAC agreement success.
Source: Author

The intermediate solution is presented in Table 6. The coverage is 0.67, meaning that the two causal paths, or formulas, for the intermediate solutions cover just over two-thirds of failure outcomes. The solution consistency is 0.77, meaning that the agreements included in the pathways that are mostly scored as failure (0).

Table 4: Intermediate solution for 'success'

Solution Formula	raw coverage	unique coverage	consistency	Cases
1. Del*~Demil*~GrtPwr	0.0921053	0.0460526	1	WEU (0.7,1), Balkans (0.7,1)
2. Del*~NatLim *~GrtPwr	0.243421	0.197368	1	Cyprus (1,1), Transd-niestria (1,1), Belfast (1,1), WEU (0.7,1)
3. ~Del*~NatLim *Demil*GrtPwr	0.236842	0.236842	1	Spitsbergen (1,1), Åland (1,1), Montreux (1,1), Lausanne (0.6,1)

solution coverage: 0.526316
solution consistency: 1
Source: Author

The first pathway combines the absence of delegation, the absence of national limitations, the presence of geographic demilitarisation and the absence of great power rivalry, which are covered by the Tartu and Moscow agreements. The second pathway combines the absence of delegation, the presence of national limits, the absence of geographic demilitarisation and the presence of great power rivalry, which is covered by the by the London Naval Agreements, the Anglo-German Naval Agreement, the Intermediate-Range Nuclear Forces (INF) Treaty and the CFE Treaty.

Interpretation
Great power rivalries
Five out of 19 agreements in this dataset do not involve a great power rivalry but were instead between regional rivals or former rivals. Contrary to theory-based expectations, the presence of great power rivalries seems to about equally contribute to agreement success and its absence. For both success and failure, the presence of great power has high consistency, though low coverage for failure (meaning that of

Table 5: Truth table for 'absence of success'

	Conditions					Outcome	Consistency			
Row	Del	NatLim	Demil	GrtPwr	number	~Success	raw consist.	PRI consist.	SYM consist.	Cases
1	0	0	1	0	2	1	0.8	0.75	1	Tartu, Moscow1940
2	0	1	0	1	4	1	0.75	0.6875	0.916667	LondonNav, Anglo-German, INF, CFE
3	0	1	1	1	2	0	0.3	0.125	0.166667	WashNav, Germany1990
4	1	1	1	1	2	0	0.3	0.125	0.166667	WWI, WWII
5	1	0	1	1	3	0	0.294118	0.294118	0.294118	Kosovo, Georgia, Minsk
6	0	0	1	1	4	0	0	0	0	Spitsbergen, Åland, Lausanne, Montreux
7	1	0	1	0	3	0	0	0	0	Cyprus, Transdniestria, Belfast
8	1	0	0	0	1	0	0	0	0	WEU
9	1	1	0	0	1	0	0	0	0	Balkans

Source: Author

the cases with great power rivalry presence, there is a somewhat low failure (0.35). This is partly due to great power rivalries being present in 15 out of the 22 agreements. This lack of a clear and consistent relationship between great power rivalry and success exists throughout the dataset's time period, including the post-Cold War period where some of the successful agreements have involved the Russia–NATO rivalry.

Table 6: Intermediate solution for 'absence of success'

	raw coverage	unique coverage	consistency	Cases
4. ~Del*~NatLim *Demil*~GrtPwr	0.235294	0.235294	0.8	Tartu, Moscow1940
5. ~Del*NatLim *~Demil*GrtPwr	0.441176	0.441176	0.75	LondonNav, Anglo-German, INF, CFE

solution coverage: 0.676471
solution consistency: 0.766667
Source: Author

Great power rivalry is present in one of the three pathways for success, with the pathway covering the Spitsbergen, Åland, Lausanne and Montreux agreements. Although not contained in this pathway, the post–Cold War Kosovo and Georgia agreements include great power rivals.

Two of the pathways for success contain the absence of great power rivalry, and include four cases: the WEU, Cyprus, Transdniestria, Balkan and Belfast agreements. Each agreement is successful to date for several reasons, but the absence of great power rivalries may have contributed to success by reducing perceptions of zero-sum competitions and the costs of relative gains and losses. Indeed, the absence of great power rivalries may have made cooperation much easier from the prisoner's dilemma perspective; parties could easily see the benefits of cooperation, but unlike other prisoner dilemmas, the benefits of defection may have been very low, if any at all.

Great power rivalry presence appears in one of the two pathways for failure, with a coverage of 0.44 and consistency of 0.75. All the agreements in this solution were peacetime, military capabilities balancing agreements: the London Naval Agreements, the Anglo-German Agreement, the INF Treaty and the CFE Treaty. This suggests that such agreements between great powers are unlikely to succeed, especially when they lack delegation to an agreement executor and lack demilitarisation. Comparing two pathways for success and failure, success is characterised by the absence of national limits and the presence of demilitarisation while failure is characterised by the presence of national limits and the absence of demilitarisation. While this might suggest that great power rivals

should, then, strive for demilitarisation instead of national limits, the problem with this interpretation is that great power rivals compete over a broad geography. It is unlikely that a limited geographic demilitarisation would substantially reduce their rivalry.

National limits and geographic demilitarisation

The results suggest that national limits are detrimental to agreement success while demilitarisation is sufficient for agreement success although its absence does not have a major impact. The intermediate solutions success includes two pathways with the absence of national limitations but does not contain any pathway that includes the presence of national limitations. In contrast, failure contains both the presence and absence of national limits its two pathways. As a necessary condition for success national limits have a consistency of 0.32 while the absence of national limits has a consistency of 0.53. Successful agreement cases with the absence of national limits but with a great power rivalry include four interwar agreements, Kosovo, and Georgia, with Minsk having failed.

Demilitarisation and its absence are in two of the three pathways for success, suggesting that its impact on agreement success is influenced by other conditions. The presence and absence of geographic demilitarisation also appear in the two pathways for failure. Geographic demilitarisation for agreement success has a consistency of 0.8 and a coverage of 0.77, suggesting that its presence may be important to success.

Delegation

Most of the successful agreements had delegation (0.84 necessary condition coverage), although the absence of delegation only had a necessary condition coverage of 0.43, meaning that almost the same number of cases without delegation succeeded as failed.

Three of the four intermediate solutions include delegation with a total raw coverage of 0.59. Similarly, the lack of delegation appears in both intermediate solutions for absence of agreement success with a total coverage of 0.34. Though the consistency of delegation presence as a necessary condition for success is only 0.54, its absence as a necessary condition has a higher consistency at 0.76. The four cases – Spitsbergen, Åland Islands, Lausanne and Montreux – in which delegation was absent but had successful agreements all entered into force during the interwar period when delegation to treaty executors was on average lower than after WWII.[13] Three of the agreements are still in effect, with the Lausanne Agreements having been superseded by the Montreux Convention. These four

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13 For more details, see Figure 1 in the supplementary information document, which is available online via: https://www.cejiss.org/images/_2024/Lippert/Lippert_CE-JISS_Online_Appendix_18-3.pdf

agreements significantly decrease the extent to which the dataset and pathways connect delegation and agreement success.

Assessing the hypothesised pathways

H_1, which proposes that the presence of great power and national limits are a pathway for agreement failure is supported in pathway 5 which consists of both interwar and Cold War balancing agreements. Similarly, H_4, which proposes that the absence of delegation and the presence of great power rivalry is a pathway to failure is reflected in this pathway.

H_2, which proposes that the presence of delegation and demilitarisation are a pathway to agreement success, was not included in any of the solutions. Rather, pathway 3 has the absence of delegation with demilitarisation and great power rivalry – though these agreements were all made prior to WWII and thus do not reflect the post-WWII US–Soviet/Russia rivalry. Nonetheless, three cases do meet this pathway: Cyprus, Transdniestria and Belfast.

H_3, which proposes that the presence of delegation and great power rivalries is a pathway to success does not appear in the success pathways, but is nonetheless composed of three cases (WWII, Kosovo and Georgia).

Contradictory row

There is a contradictory row containing the Kosovo, Georgia and Minsk agreements. Both are characterised by full delegation, demilitarisation and great power rivalry but not national limits. In the case of Kosovo, delegation is to NATO, geographic demilitarisation was along the former Yugoslav of the Kosovo-Yugoslav border (Serb/Yugoslav forces were subject to various restrictions and prohibitions), and the great power rivalry was between the US/NATO and Russia. For the Minsk agreements, the delegation was to the OSCE's SMM, the geographic demilitarisation was along the line of contact and applied to both sides, and the great power rivalry was also between the US/NATO and Russia. In Georgia, delegation is to the EU Monitoring Mission (EUMM), although it mostly operates on the 'Georgia' side of the current border. The demilitarisation conditions for Georgia's Six-Point Peace Plan (which, compared to other CAC agreements, is exceptionally brief) are vague, but state that Georgian forces were to return to their garrisons and that Russian forces were to return to pre-conflict levels and positions.

Though the three agreements share the same rivalry, the Kosovo agreement has not been impacted by the rivalry while that concerning Georgia is stable, although disputes at many levels persist. In contrast, the Minsk agreements failed in large part due to great power rivalry. Explaining why one out of these three has failed, or how two out of three have succeeded, is difficult and may come down to the particulars of each case. One possible reason is that Russia

does not view the Kosovo agreement as giving the US a decisive relative advantage, while in Georgia the more contentious ceasefire may reflect Russia's perception of Georgia remaining outside of the EU and NATO as important, but not critical. In Ukraine's case, Russia may simply have viewed any loss of influence or control in Ukraine as too threatening to its core security interests (Layne & Schwarz 2023).

Another explanation may be that peace and stability in the Western Balkans may benefit Russia for any number of reasons and Russia is largely satisfied with the status quo in Georgia as it controls the territory that it seeks, and has no desire to invade, occupy and/or annex Georgia. Russia and the US/NATO view Ukraine as a critical, strategic state with clear, relative gains and losses to either side depending on the outcome.

Confounding comparisons of the three cases is that while NATO decisively defeated Yugoslavia in Kosovo, thus reducing the likelihood of Yugoslavia or Russia contesting the agreement, Russia held advantages in both Ukraine and Georgia – but only in Ukraine did it undermine and then defect from the CAC agreement with the outbreak of general conventional conflict in 2022.

This contradictory row emphasises that other unique factors, which may not have applicability in other CAC agreements, can supersede the four conditions set forth in this study.

Agreement types

As previously noted, this study's agreement dataset can also be analysed by agreement categories, and here QCA offers several insights. For the intermediate solution for success, there is a mix of post-conflict, cease-fire and peacetime agreements. Pathway 1 only applies to balancing agreements while pathway 3 applies only to demilitarisation. Pathway 1 is characterised by delegation, absence of demilitarisation and absence of great power rivalry while pathway 3 is the opposite in these three conditions. This suggests that high delegation is not necessary for demilitarisation agreements even when great power rivalries are involved, which is contrary to the theory which holds great power rivalries and contribute to great power success. At the same time, high delegation may play an important role in non-great power rivalries for balancing agreements, whether it is because the treaty executors have more tools and diplomatic strength to encourage compliance compared to treaty executors of balancing agreements between great power rivals. The only cases which included the combination of delegation, national limits and great power rivalry presence are the post-WWI and WWII peace agreements – one of which succeeded and the other which is not considered a success. Most of the balancing agreements, characterised by low delegation and national limits, were not fully successful (pathway 5).

Pathway 4 only concerns the bilateral relationship between Russia and Finland, with the Tartu agreement effectively locking in an imbalance (Russia's superiority) through demilitarisation that did not follow a conflict – a unique case in the dataset. The second agreement concerns the short-lived peace agreement between the two countries following the Winter War, which might generally characterise post-conflict agreements in which there is a clear and much more powerful victor.

Pathway 5 for agreement failure are all peacetime balancing agreements between great powers, emphasising the challenges these types of agreements face when they aim to limit national capabilities without delegation.

Generating separate truth tables and analysing the data for balancing and demilitarisation agreements separately offers limited insights because of the smaller dataset and the reduced variety of conditions (Hirzalla n.d.: 2.2). Balancing agreements are characterised by a high consistency (0.9) absence of delegation, with a relatively high coverage of 0.6. A simpler pathway for success was produced for the demilitarisation dataset that included the absence of delegation which (compared to pathway 3) contained the 1990 Germany agreement (which also contains national limitation). This pathway again emphasises that absence of delegation can still characterise successful agreements.

Conclusion

Under what conditions are CAC agreements in Europe successful or unsuccessful? This study applied QCA to understand what combinations of conditions contribute to and may cause success or failure. Its results support the hypotheses that the combination of great power rivalries and quantitative limits on states' national military capabilities such as capital ships, tanks and combat aircraft are a pathway to agreement failure. Likewise, the *absence* of delegation to international organisations and agreement executors such as the UN and OSCE can lead to agreement failure when great power rivalries are involved. Although the combination of delegation to agreement executors with geographic demilitarisation, such as the creation of buffer zones and limitation of military capabilities within a specific geographic area such as an island, and delegation to treaty executors with great power rivalries were hypothesised to be pathways for success, these did not appear in the solutions generated by the fsQCA software although they did appear as combinations in the truth table for success.

No intermediate solution pathway has high coverage and high consistency and no single condition is necessary for any outcome. The presence of contradictory outcomes despite the same conditions for the Kosovo, Georgia and Minsk agreements emphasises that the same conditions can have different outcomes. However, several combinations of conditions also have the same outcome for more than one case, suggesting that equal combinations of conditions may lead

to the same outcome in the future. This is an important discovery because states are more likely to want CAC agreements to succeed than fail.[14]

This study is somewhat optimistic about CAC in general, but less optimistic about NATO–Russia efforts to address military balances through CAC due to failure of great power rivalry agreements with national limitations – the precise kinds of agreements that both NATO and Russia seek. The good news for peace is that even between great power rivals, CAC agreements can succeed and lead to a broader, stable peace. And although efforts to impose CAC on defeated states following WWI failed with the outbreak of the next world war, WWII never saw a return of the Central European powers against their east and west neighbours. Many factors contributed to this, and one of them may have been moral disarmament – or the removal of the desire or ambition to go to war, especially world war. This concept, developed between the world wars, seems to have worked well after WWII. CAC likely contributed to stabilising the peace in a number of ways and may be an important step in the process, but the internalised aversion to major European continental wars runs beyond CAC agreements (Barros 2006; Goldblat 2002: 27–28; Henderson 1935: chap.: 12).

This article raises additional areas of research. First, it has selected four independent conditions. However, CAC agreements may have other conditions or variables which might be worth considering, or otherwise state parties' characteristics. These might include assessing differences in national military capabilities, the state of relations or global economic conditions at the time of signature and in the following years. Other conditions or outcomes might consider changes that the agreements incorporated or compelled, such as alterations in the military balance, changes in levels of stability and improvements in diplomatic relations. Different conditions might offer additional insights, including QCA analyses which include some of the conditions used in this study and conditions that this study excluded.

Second, this study has used a very specific dataset. Additional cases could be added, either broadening the cases geographically, historically by including earlier agreements, and/or to include other types of agreements including nuclear agreements. However, if the outcome of success or failure of an agreement is largely defined by whether conflict occurs between state parties, cases would need to have a relationship with conflict causation. In general, this would exclude, for example, universal, humanitarian agreements such as the anti-personnel landmine treaty.

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14 This is due to the phenomenon of mutual benefits obtained through CAC agreements, which may include economic savings, improving diplomatic relations, decreased threat of surprise attack and domestic satisfaction – benefits encapsulated in the resolution of the prisoner's dilemma. However, for some CAC agreements, especially ones in which a defeated state has CAC imposed, the states may seek to violate and escape from the agreement, as was the case during the interwar period.

The 22 cases in this dataset suggest that the variation in CAC agreement conditions and outcomes are due in part to the variable situations in which they are created. Moreover, their relative infrequency may mean that the institutional knowledge which resides with those who crafted one agreement necessarily carries on to the next.[15]

The Russia-Ukraine war is the largest and most tragic conflict to befall Europe since WWII and was caused in significant part by the failure of CAC in Europe. However, CAC remains relevant today even while the war rages. A ceasefire might see the creation of a buffer zone, while a longer-term end to the conflict might include national limitations either limited to Ukraine or more broadly across Europe. This article has attempted to suggest how different CAC conditions might interact to stabilise peace successfully, and how some combinations of conditions may be more likely to fail than others.

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15 For example, a Europe-wide CAC has not been drafted and signed since the 1999 Adapted Conventional Armed Forces in Europe Treaty (A/CFE) which never entered into force.

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