

Supplementary file

Lippert, William (2024): Conventional Arms Control Agreements in Europe: Conditions of Success and Failure. *Central European Journal of International and Security Studies*, 18(3), 5–37. DOI of the article: 10.51870/WGUO2938

Online Appendix

Table 1: QCA solutions and necessary conditions for success

Complex Solution				
	Coverage			
	Raw	Unique	Consistency	Cases
Del*~Demil*~Grtpwr	0.196721	0.057377	1	Belfast, WEU, Balkans
Del*~NatLim*~Demil	0.221311	0.0819672	1	Belfast, Georgia, WEU
~Del*~NatLim*Demil*Grtpwr	0.295082	0.295082	1	Spitsbergen, Åland, Lausanne, Montreux
Del*NatLim*Demil*Grtpwr	0.114754	0.114754	0.7	WW1, WW2
solution coverage: 0.688525				
solution consistency: 0.933333				
Parsimonious Solution				
	Coverage			
	Raw	Unique	Consistency	Cases
Del*NatLim	0.172131	0.114754	0.777778	WW1, WW2, Balkans
~Del*~NatLim*Grtpwr	0.295082	0.295082	1	Spitsbergen, Åland, Lausanne, Montreux
~NatLim*~Demil	0.245902	0.0245902	1	WEU, Belfast, Georgia
Del*~Demil	0.278689	0	1	Belfast, Georgia, WEU, Balkans
solution coverage: 0.713115				
solution consistency: 0.935484				

Necessary conditions for success

Condition	Consistency	Coverage
Del	0.508197	0.794872
~Del	0.491803	0.535714
NatLim	0.311475	0.475
~NatLim	0.688525	0.763636
Demil	0.590164	0.654545
~Demil	0.409836	0.625
Grtpwr	0.721312	0.628571
~Grtpwr	0.278689	0.68

Source: Author

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Table 2: QCA solutions and necessary conditions for absence of success

Complex Solution				
	Coverage			
	Raw	Unique	Consistency	Cases
~Del*~NatLim*Demil*~Grtpwr	0.235294	0.235294	0.8	Tartu, Moscow1940
~Del*NatLim*~Demil*Grtpwr	0.441176	0.441176	0.75	LondonNav, Anglo-German, INF, CFE
solution coverage: 0.676471				
solution consistency: 0.766667				
Parsimonious Solution				
	Coverage			
	Raw	Unique	Consistency	Cases
~Del*~Grtpwr	0.235294	0	0.615385	Tartu, Moscow1940
~Del*~Demil	0.441176	0	0.652174	LondonNav, Anglo-German, INF, CFE
Demil*~Grtpwr	0.235294	0	0.8	Tartu, Moscow1940
NatLim*~Demil*Grtpwr	0.441176	0	0.75	LondonNav, Anglo-German, INF, CFE
solution coverage: 0.676471				
solution consistency: 0.69697				

Necessary conditions for ~success

Condition	Consistency	Coverage
Del	0.235294	0.205128
~Del	0.764706	0.464286
NatLim	0.617647	0.525
~NatLim	0.382353	0.236364
Demil	0.558824	0.345455
~Demil	0.441176	0.375
Grtpwr	0.764706	0.371429
~Grtpwr	0.235294	0.32

Source: Author

Table 3: Success calibration

Determining the success of a CAC agreement is complicated because there are a number of criteria by which to judge the agreement, but overall context is also important. One measure is the years of effectiveness. Others include whether there were suspensions or withdrawals, whether or not conflict eventually broke out including after the agreement's expiration, or if the states ended their rivalry. Treaties do not necessarily have a specific date of termination, and major parties might withdraw from an agreement while others remain. Treaties can also evolve into other agreements. The below calibration formulas are guidelines as much as an equation, because of the importance of overall context.

Years effective

- 0-10 = 0
- 10-20 = 0.4
- 20+ but not effective after 20+ due to suspensions, withdrawals, etc. between major rivals = 0.6
- Still in effect, evolved into another (similar) agreement, or no longer applicable due to end of adversarial relationship = 1

Agreement	Explanation	Years Implemented	QCA Score
Post World War One Peace Treaties	The defeated and victorious states went to war again about 20 years later. Hitler declared that Germany would rearm in 1935.	16	0.4
The Svalbard (Spitsbergen) Treaty	There has not been any conflict between state parties over the Spitsbergen archipelago, and no substantial violations.	Still in effect	1
Finnish-Russian Dorpat/Tartu Agreement	Finland and Russia ended up going to war, for a number of reasons, in part due to perceived threats from areas under the agreement.	19	0.4
Åland Island convention	There has not been any conflict between state parties over the Åland Islands, and no substantial violations.	Still in effect	1
Washington Naval Treaty	The agreement expired after 13 years, as it was written to expire unless renewed. Italy went to war against France and the UK, and though it is outside of the article's scope, Japan went to war with the	13	0.4

Agreement	Explanation	Years Implemented	QCA Score
	US and UK over naval control of the Pacific.		
Lausanne Agreements of 1923	These agreements concerning Turkish and Greek demilitarization and control and access to the Bosphorous Straits were respected, and no conflict occurred concerning Turkey's control of the Straits.	Was replaced by (evolved into) the Montreux Convention	1
London Naval Treaties	The treaties failed to reduce tensions between state parties, and war broke out between them within a decade. The first treaty lasted 9 years, the second 3 years, for an average of 6.	6	0
Anglo-German Naval Treaty	While the agreement was respected during its brief lifetime in part due to the inability of Germany to produce beyond the treaty's limits, the overall rivalry continued and war broke out between the countries within a few years.	4	0
Montreux Convention of the Straits	This agreement is still in force, even with conflict having occurred several times in the Black Sea region since its passage. Turkey has meticulously observed and implemented the treaty, and no state has attempted to militarily contest Turkey's control over the Straits.	Still in effect	1
The Moscow Treaty (Finland and Russia) of 1940	The treaty which ended the Winter War was quickly violated when Finland joined Germany in attacking the USSR.	1	0
Post-World War Two agreements	The post-WW2 agreements were successful in that the states that composed the Axis never attacked the Allied states again, and there was no attempt to violate the mostly vague CAC controls imposed on the Axis states without the Allies' permission. However, the onset of the Cold War largely	N/A	1

Agreement	Explanation	Years Implemented	QCA Score
	negated all of the post-war CAC agreements, with only the agreement applying to Finland being generally respected, and war never breaking out between it and the USSR after the treaty's entry into force.		
WEU agreements	The WEU agreements that set controls on its member states, particularly Germany, succeeded. Germany never exceeded the NATO-authorized military quantities, and (Western) Germany did not go to war with any of the western WW2 Allies. The WEU agreements expired or transitioned to the EU in 2000–2002; but the Final (Peace) Settlement for Germany was signed in 1990, which included CAC.	Approximately 36, or N/A	1
INF Treaty	While the agreement was respected for over 20 years, and the US and USSR/Russia have not gone to war, Russia violated the agreement due to perceived military imbalances caused by the agreement, and the violations resulted in the US withdrawal. Russia's invasion of Ukraine is also an indicator of the agreement's failure.	32	0.6
CFE Treaty	The CFE Treaty is difficult to assess at several levels. Its original purpose of preventing the Warsaw Pact or NATO from launching a surprise attack became irrelevant between the dates of signature and entry into force with the Warsaw Pact's dissolution. The treaty somewhat adapted to provide general regional stability and transparency. While state parties engaged in conflict with one another, the overall, evolved objective of preventing a large-	15	0.4

Agreement	Explanation	Years Implemented	QCA Score
	scale surprise attack and conventional war between NATO and Russia (as the Warsaw Pact's successor) was largely accomplished, not just until 2007 when Russia withdrew, but to this day. In 2023, Russia withdraw from the treaty and NATO states suspended their participation in the treaty. It is calibrated as less rather than more successful because Russia's suspension/withdrawal was linked to its dissatisfaction with the military balance and NATO expansion, both of which have contributed to Russia's decision to invade Ukraine.		
Subregional Arms Control (Balkans)	State parties of the Balkans CFE Treaty, as it is sometimes referred to, have not gone to war with one another since the agreement's signature and entry into force. The 1999 Kosovo conflict did not involve combat between the state parties.	Still in effect	1
Belfast Agreement	The Belfast Agreement has seen the UK withdraw a large part of their military forces, and paramilitary violence is much lower in Northern Ireland compared to the period of the Troubles.	Still in effect	1
Military Technical Agreement between the International Security Force ("KFOR") and the Governments of the Federal Republic of Yugoslavia and the Republic of Serbia	Since the agreement's signature, there has not been armed conflict between NATO and Kosovo on one side, and Serbia.	Still in effect	1

Agreement	Explanation	Years Implemented	QCA Score
Six-Point Peace Plan for Georgia	While the status of South Ossetia and Abkhazia remain in dispute, fighting between Georgia and Russia has not occurred since the peace plan's implementation. Russia violated several aspects of the treaty concerning the presence and size of its armed forces in South Ossetia and Abkhazia, but this has not resulted in conflict and is of questionable military significance in the long-term given the imbalance of military capabilities overall.	Still in effect	1
Minsk Agreements	The Minsk Agreements were never substantively respected, and Russia's invasion of Ukraine is another manifestation of the agreement's abject failure.	7	0

Source: Author

Table 4: Delegation calibration

Agreement	Raw Score	QCA calibrated score	Brief explanation
WW1	6	1	WW1 established international commissions of control, composed of the victorious powers, to oversee implementation of the military aspects of the peace treaties.
Spitsbergen	1	0	Spitsbergen did not have any agreement executor.
Tartu	0	0	There was a small commission created to oversee the agreement, but it was composed of state representatives and had no substantive authority
Åland	1	0	The agreement identified the League of Nations to review and adjudicate any challenges or disagreements, but none ever arose.
WashNav	0	0	There was no treaty executor created.
Lausanne	3	0.4	The Straits Commission created to oversee the Lausanne Agreements were composed of state parties and had limited authority and responsibilities. The League of Nations, its Council and the Straits Commission were assigned various tasks, but in actuality Turkey oversaw the agreement's execution.
LondonNav	0	0	There was no treaty executor created.
Anglo-German	0	0	There was no treaty executor created.
Montreux	1	0	The League of Nations, and now potentially the UN Security Council, might adjudicate disputes but implementation of the treaty is Turkey's responsibility.
Moscow1940	0	0	There was no treaty executor created.
WW2	7.5	1	The Allied Control Councils and Commissions (ACCs) had sweeping authority over the defeated and occupied states.
WEU	5	0.7	The WEU Armaments Control Agency (ACA) was created by WEU members to oversee and inspect military limits of its members, particularly Germany.
INF	0	0	The treaty executor was small and entirely composed of state party representatives, with limited authority.
CFE	0	0	The treaty executor was small and entirely composed of state party representatives, with limited authority.
Balkans	5	0.7	The OSCE was extensively involved in implementation and the agreement created the Subregional Consultative Commission (SRCC), which was composed of state party representatives.
Belfast	6	1	The agreement created the Independent International Commission on Decommissioning (IICD) and the

Agreement	Raw Score	QCA calibrated score	Brief explanation
			Independent Monitoring Commission (IMC). Both were fully independent, without any state party representation.
Kosovo	7	1	The agreement gives NATO/KFOR authorization to use military force to deal with non-compliance and violations. Implementation was a combination of KFOR, NATO, and the Joint Implementation Commission (JIC) with Serbia.
Georgia	6.5	1	The EU created and deployed the EU Monitoring Mission (EUMM) to oversee the peace plan. The EUMM was independent of any single EU member, and it was a delegation on the part of Georgia. The EUMM is not operating in the separatist areas.
Minsk	6.5	1	The OSCE created the Special Monitoring Mission (mandated by OSCE members) to oversee the Minsk Agreements. This included field offices throughout Ukraine, with over 1000 SMM officials.

Source: Author

Table 5: National limits calibration

Short Name	QCA calibrated score	Brief explanation
WW1	1	Extensive limits on national inventories of the defeated states.
Spitsbergen	0	No national limitations.
Tartu	0	No national limitations.
Åland	0	No national limitations.
WashNav	1	Limits on naval forces by class, expressed as the number of ships in each class.
Lausanne	0	No national limitations.
LondonNav	1	Limits on naval forces by class, expressed as the number of ships in each class.
Anglo-German	1	Limits on naval forces by class, expressed as the number of ships in each class.
Montreux	0	No national limitations.
Moscow1940	0	No national limitations.
WW2	1	Several states had limits placed on the number of troops, types of weapons, and quantity of certain weapon systems.
WEU	0	There was not a specific limit placed on any state, but states were not to exceed the planned NATO force sizes. This flexible and somewhat ambiguous limitation results in a coding of absence of national limits.
INF	1	The state parties were prohibited from possessing anywhere conventional missiles of a certain range.
CFE	1	State parties agreed to a large number of conventional arms restrictions based primarily on national counts.
Balkans	1	State parties agreed to conventional arms limitations.
Belfast	0	While the UK agreed to reduce its military forces in Northern Ireland, no agreement specified exactly what the reduction and end state should be.
Kosovo	0	No national limitations.
Georgia	0	No national limitations.
Minsk	0	No national limitations.

Source: Author

Table 6: Geographic demilitarization calibration

Short Name	QCA calibrated score	Brief explanation
WW1	1	Extensive limitations on fortifications and other military capabilities in certain locations.
Spitsbergen	1	Spitsbergen was not to be militarized
Tartu	1	Extensive limitations on fortifications and other military capabilities in certain locations.
Åland	1	Åland Islands were not to be militarized.
WashNav	1	Various restrictions on fortifications and bases in certain locations.
Lausanne	1	Various restrictions on fortifications and other military capabilities in certain locations.
LondonNav	0	No geographic limitations.
Anglo-German	0	No geographic limitations.
Montreux	0	No geographic limitations on land (fortifications, etc.). There are limitations on which states can use the straits with what kind of ships, and other limits on ships. However, this does not fall into the usual category of demilitarization, of limiting forces in a geographic area to stabilize forces and security. The restrictions are on the passage through the Straits, rather than in the Black Sea itself. Thus, a state could theoretically build or assemble a ship of any size and quantity in the Black Sea.
Moscow1940	1	Extensive limitations on fortifications and other military capabilities in certain locations.
WW2	1	Limitations on fortifications and other military capabilities in certain locations for Italy and Bulgaria.
WEU	0	No geographic limitations.
INF	0	No geographic limitations.
CFE	0	No geographic limitations.
Balkans	0	No geographic limitations.
Belfast	0	No geographic limitations.
Kosovo	1	Areas along the border were prohibited to Serbian/Yugoslav military forces.
Georgia	0	There were no specific, quantitative prohibitions or limitations along the border or contested areas. The agreement called for withdrawal to pre-conflict positions, but this was vague.
Minsk	1	Extensive limitations on various weapon systems along the line of contact.

Source: Author

Table 7: Great power rivalries calibration

Determining in the first place whether or not a great power rivalry exists requires a historical assessment of the relations and perceptions at the time of the agreement's signing (see appendix for the determination of great power status). Mazaar et al. (2021, 5, 7) note that identifying a rivalry can be difficult in part because even rival relationships can be a mix of positive and negative relations, but are often defined by 'a serious clash of goals and objectives...with an ingrained sense of dislike or hatred and with some degree of zero-sum clashes of intention,' and a 'history of conflict.' Moreover, especially during the interwar period, some rivalries evolved slowly from cooperative and friendly relationships, and from which point or year the relationship was more one than the other is not always clear. This complicates calibration in QCA. While the method and software support scores between 0 and 1, it is unclear theoretically how great power rivalries can be measured along a scale. Thus, they are determined to be present (1) or absent (0).

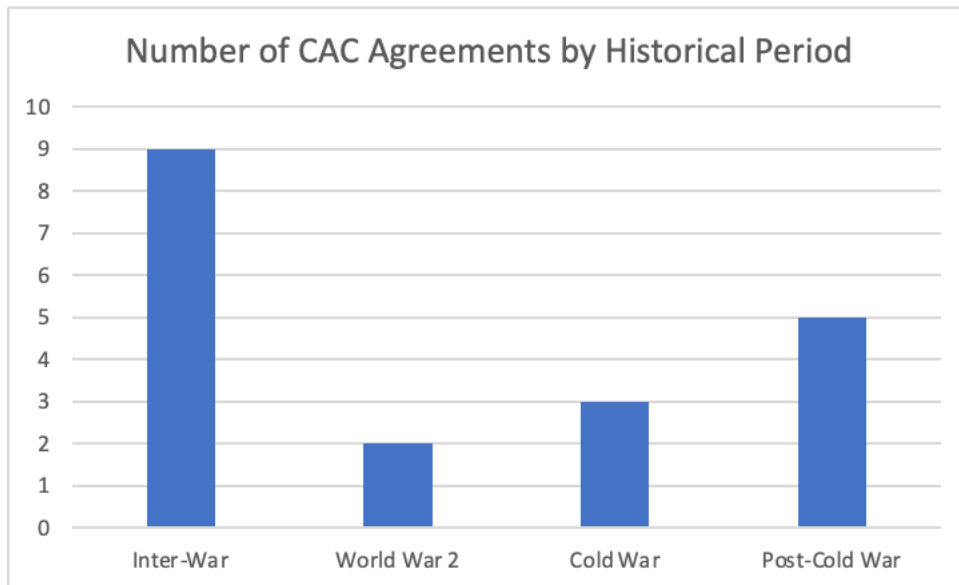
For the interwar cases, a determination was made by assessing the geopolitics at the time of signature between great power signatories of the given treaty, complemented by awareness of future relations. In many cases, the determination is straightforward: practically by definition, any agreement between the US and Soviet Union during the Cold War or NATO and the Warsaw Pact were great power rival agreements. However, in some instances the impact of the rivalry on an agreement, or the extent to which a great power rivalry is partly or mostly the cause of an agreement, is uncertain. For example, while the Spitsbergen agreement was not initially signed by great power rivals in Europe as in 1920 relations between the World War One allies of the US, France, Italy, and the UK were warm, many other states including great powers acceded to the agreement prior to World War Two, including Germany and the Soviet Union. The island was strategically significant enough that the Germans and Allies clashed over it during World War Two.

Some scholars and analysts view the fighting in Georgia in 1998 ended by the Six Point Peace Agreement as being rooted in Georgia's goals to join the EU and NATO (Phillips 2011).

Short Name	QCA calibrated score	Brief explanation
WW1	1	Peace agreement following a great power war.
Spitsbergen	1	Original signatories were not rivals (possibly Italy) – but in any case, with the additional signatures major great power rivals joined.
Tartu	0	The agreement was between Russia (great power) and Finland (not a great power).
Åland	1	1921 Germany; clearly the French viewed Germany as a rival (Wright; various inter-war articles).
WashNav	1	The agreement involved European rivals, particularly Italy, UK, US, and France.
Lausanne	1	The main great power rivalry was UK vs. Russia. In 1923, Manne suggests deep disagreement with the UK - anti-Soviet attitudes in the UK.
LondonNav	1	The agreement was between growing great power rivals, particularly with Italy vs. UK and France.
Anglo-German	1	Clear UK vs. Germany rivalry.
Montreux	1	In 1936 Russia was clearly a great power rival with the UK and France among other states (Manne 1981; Watson 2000); in general, it is clear that Russia was a competitor, attempting to balance competing interests which were ultimately manifested in the Ribbentrop-Molotov Pact.
Moscow1940	0	The agreement was between Russia (great power) and Finland (not a great power).
WW2	1	Peace agreement following a great power war.
WEU	0	Germany at this time was an ally of the other WEU members.
INF	1	US and Soviet Cold War rivalry.
CFE	1	NATO and Warsaw Pact Cold War rivalry.
Balkans	0	No great powers are state parties.
Belfast	0	The agreement is primarily between the UK and Republic of Ireland, with the latter not a great power rival.
Kosovo	1	The conflict is viewed as the start of the post-Cold War US-Russia rivalry. The agreement itself was facilitated by a UNSC resolution (which includes the US and great powers in Europe).
Georgia	1	The conflict was motivated in part by Georgia's gravitation towards NATO and the EU, contrary to Russia's preferences.
Minsk	1	The conflict was motivated in part by Ukraine's gravitation towards NATO and the EU, contrary to Russia's preferences.

Source: Author

Figure 1: CAC agreements by historical period



Source: Author

Supplementary file

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