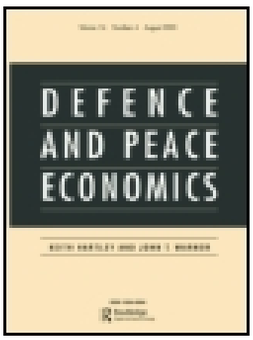

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Arms Racing, Military Build-Ups and Dispute Intensity: Evidence from the Greek-Turkish Rivalry, 1985-2020

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ABSTRACT

Arms races are linked in the public conscience to potential violence. Following gas discoveries in eastern Mediterranean, Greece and Turkey nearly came to blows in August 2020 and both states have enacted military expansion plans, further risking escalation. We present a novel approach to study the effect of military build-ups on dispute intensity, using monthly data on Turkish incursions into Greek-claimed airspace. Because airspace claims feature strongly in the dispute, these contestations represent an appropriate measure of the intensity with which Turkey pursues the conflict. Theoretically, we suggest that bilateral factors drive this intensity. We argue that increased Greek military capabilities deter incursions whereas increased Turkish military capabilities fuel them. Results from time-series models support the second expectation. Consequently, the study provides a novel methodological approach to studying interstate conflict intensity and shines new light on escalation dynamics in the Greek-Turkish dispute.

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Territorial Dispute; Interstate Rivalry; Greece; Turkey; Military Expenditures

Introduction

Military build-ups are threatening stability in the Eastern Mediterranean. In August 2020, tensions between Greece and Turkey escalated to dangerous levels after a sequence of events including a Greek-Egyptian delimitation agreement ignoring Turkey's territorial claims and Turkish drilling ships entering disputed waters. At the same time, the two militaries are ramping up their capabilities. Turkish military expenditures have increased by 86% during the past decade and Greece, despite its economic struggles, announced the procurement of 18 state-of-the-art Rafale aircraft and plans to add four new frigates to its navy. The August 2020 naval stand-off between Greece and Turkey highlights the destructive potential of military build-ups. The devastating prospects of a military confrontation between the two NATO allies has not eschewed the attention of the international community. The rivals' military build-up forced a European intervention with German chancellor Angela Merkel commenting that '*it's hard to imagine how small the distance between military conflict and peaceful settlement can get in some cases*' and reiterating the need for cooperation in EU-Turkey relations (Ekathimerini 2020). At the same time, France's president Emmanuel Macron condemned Turkey's President Recep Tayyip Erdogan's 'unacceptable behaviour' (Al Jazeera 2020) and authorized a Greek-French joint military exercise in Eastern Mediterranean that further contributed to the ongoing military build-up.

However, existing studies find a mixed effect of arms races on conflict (Wallace 1979; Diehl 1983, 2020; Horn 1984; Intriligator and Brito 1984; Rider, Findley, and Diehl 2011; Sample 2012) and it is

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thus unclear whether military build-ups result in conflict escalation. Some argue that arms races increase fighting capacity, threat perception, and incentivize states to capitalize on temporary military advantages, thus making conflict more likely (Wallace 1979; Morrow 1989, Maiolo 2016; Diehl 2020:38, see also Sample 2012). Others argue that arms races have no effect on conflict onset because of mutual deterrence or the rivals' financial and political exhaustion due to their military build-ups (Smith 1980:279, see also Richardson 1960:40; Rider, Findley, and Diehl 2011; Diehl 2020). For instance, Diehl (1983) reports that 77% of interstate wars were not preceded by an arms race, whereas Horn (1984) finds that only 9 out of 15 six-year and 6 out of 13 twelve-year arms races resulted in war.

Against this background, we propose that the mixed effects of military build-ups on conflict result from shortcomings associated with the use of conflict onset as a measure of military tensions in a dispute. Conflict onset captures only profound cases of military escalations and ignores the lower levels of contention which are characteristic of most interstate rivalries. For instance, military spending was a decisive factor in the Cold War but the probability of an armed conflict between the two superpowers was limited. Nonetheless, military tensions among the USA and USSR varied significantly between the 1950s and 1980s due to military build-ups but this variation is not captured by conflict onset measures (Intriligator and Brito 1984). We thus focus on lower-level military actions to study the effects of military build-ups on international conflict, namely Turkish incursions into Greek-claimed airspace. These incursions form a salient part of the dispute as they often lead to dogfights between Greek and Turkish fighter planes, have the potential to induce more severe crises, and even affect Greek economic outlooks (Kollias 2004; Athanassiou, Kollias, and Syriopoulos 2006). Just like more violent acts of contestation, airspace violations involve the use of military means to achieve political goals, such as claiming territory or signalling intentions (Pitsoulis and Schwuchow 2014; Owsiak 2015: 56; Kollias, Paleologou, and Stergiou 2016; Williams 2010). Focusing on low intensity conflict, such as airspace violations, thus allows us to more accurately capture varying tensions in an interstate rivalry even if no proper fighting takes place. Because airspace claims are a key component of the dispute, these contestations represent an appropriate measure of the intensity with which Turkey pursues the conflict. Theoretically, we suggest that increased Greek military capabilities deter airspace violations whereas increased Turkish military capabilities fuel them. Results from time-series models support the second expectation but are more mixed for the first. Consequently, the study provides a novel methodological approach to studying low-intensity variations in the intensity of interstate territorial disputes and shines new light on escalation dynamics in the Greek-Turkish dispute.

The Greek-Turkish dispute has been a thorn in the side of NATO since the duo's accession in the organization in 1952. The two states have been historical rivals and despite numerous Western-led diplomatic efforts the dispute remains unresolved (Sezer 1991; Krebs 1999; Ifantis 2004, 2018; You 2016). The discovery of gas in the Eastern Mediterranean has exacerbated Greek-Turkish contestations over maritime and aerial borders and the August 2020 naval stand-off was the latest chapter in a series of high-risk military crises dating back to 1976. Evidence suggests that the Greek-Turkish tug of war has manifested at different points in time to an arms race since Greek policy-makers pay particular attention to the Turkish military expenditure (Kapopoulos and Lazaretou 1993). Throughout the 1930s, procurements for the Greek navy were dictated by the expansion of the Turkish navy (Güvenç and Barlas 2003; Fotakis 2010). Likewise, a Greek-Turkish arms race transpired between 1950 to 1989 (Avramides 1997; Kollias and Makrydakis 1997; Kollias and Paleologou 2002, see also Ocal and Yildirim 2009), but the 2009 financial crisis has had a severe impact on the Greek defence budget (Kollias, Paleologou, and Stergiou 2016) and Greece has been unable to keep up with Turkish military expenditure since (see Figure 1). Nevertheless, other studies dispute the findings and instead argue that the two defence budgets operate independently from one another (Georgiou 1990; Stavrinos 1992; Georgiou, Kapopoulos, and Lazaretou 1996; Paparas, Richter, and Paparas 2016). Therefore, it ultimately remains unresolved to what extent the Greek-Turkish rivalry features an arms race.

At the same time, it is clear that the two states have opposing views on their maritime and aerial borders. Airspace violations are central to the dispute and these contestations represent an appropriate measure of the intensity with which Turkey pursues the conflict (see Kollias 2004; Athanassiou, Kollias, and Syriopoulos 2006). Turkish violations of the Greek-claimed airspace have been on the rise since 2013 and 2020 is on track to be a record year (Figure 1). Hence, it comes as no surprise that the most serious crisis in Greek-Turkish affairs in years occurred in 2020. In August 2020, Turkey sent its navy to sea with drilling and survey ships to challenge a delimitation agreement Greece signed with Egypt and a deal signed by Israel, Cyprus and Greece for an underwater pipeline that would provide European markets with natural gas from the Eastern Mediterranean. Military posturing that lasted for almost 45 days brought the navies of Greece and Turkey to the brink of clashing violently. Consequently, the study of airspace violations has not only the potential to increase our understanding of the escalatory effects of military build-ups but also has significant political implications by providing early warnings of rising military tensions between the two rival states.

The paper is structured as follows: First, we offer a comprehensive overview of the state of play in Greek-Turkish affairs. Then, we discuss how military expenditures or an arms race may drive the intensity of a territorial dispute. Following this discussion, we theorize how changes in military expenditure will affect the number of airspace violations in the Greek-Turkish dispute. Next, we introduce our data and research design and proceed to discuss the empirical findings. Finally, we present our closing remarks and policy implications in the study's conclusions.

The Greek-Turkish Tug of War

The Greek-Turkish relationship is about bitter history memories, blood spilled, refugee drama, forced population exchanges, conflicting national narratives and, among certain constituencies, racist representations of each other. But it is equally so about geopolitical competition, security anxieties and competing sovereignty claims. Greece and Turkey have been locked in conflict for almost two centuries.

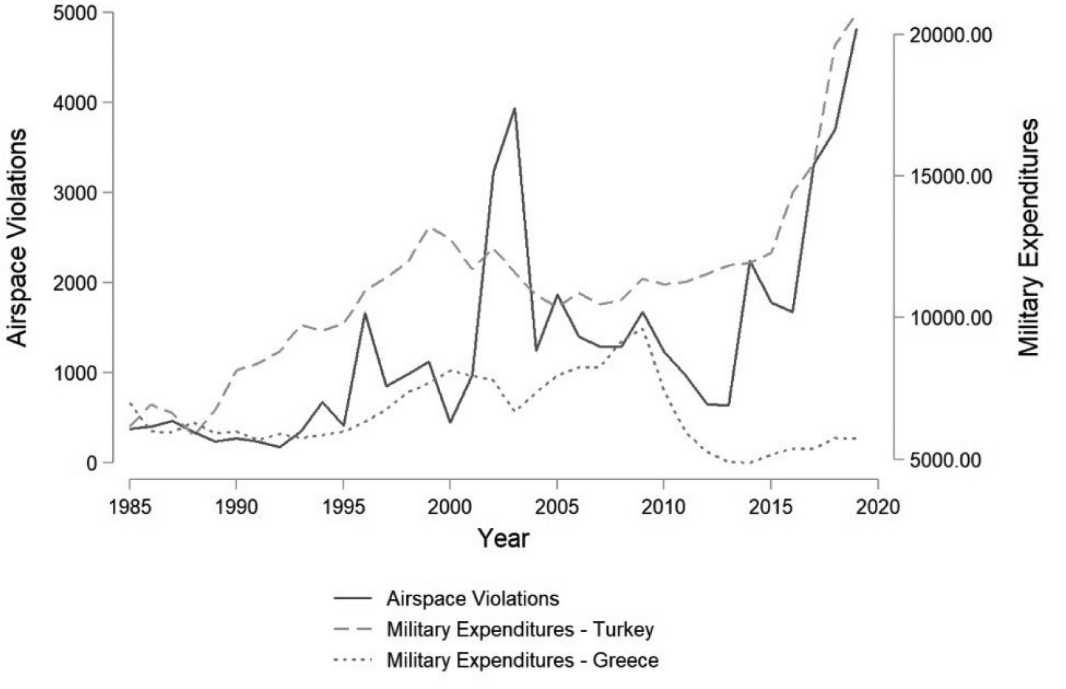

Figure 1. Military expenditures and airspace incursions.

Greeks were among the first national groups to rise against the Ottoman Empire in 1821 and achieve national statehood, thus precipitating its final collapse during the First World War. As international events evolved and borders changed, the intensity of the competition and conflict flared and waned.

In 1923, Mustafa Kemal founded the Turkish Republic after defeating the Greek Army in Western Anatolia. The events of this period (1821–1923) have certainly informed national identities and entertained persisting historical animosities. But they did also settle, to some degree, the underlining nationalistic claims on both Aegean shores. By any measure, the starting point of the modern era in Greek-Turkish relations is the signing of the Treaty of Lausanne in 1923. The Treaty was signed between Turkey and the Allies, including Greece. Although the Treaty is about the sovereignty and territorial physiognomy of the Republic of Turkey, in Greece it is considered as the bedrock of the country's boundaries on land and at sea and as the end of Greek 19th century romanticized irredentism.

However, the potential for conflict never really went away. Rather, in several instances it escalated and became a permanent source of regional and international concern. Both countries joined NATO in 1952 and the Greek-Turkish tug of war became a major source of instability in the Eastern Mediterranean and a worry to the NATO allies. Throughout the Cold War, the potential for a major clash between the two neighbors was salient to the regional security dynamics. The Cold War strategic imperatives of the US were instrumental in containing a form of 'hot peace' between Athens and Ankara. It was the summer of 1974, when the threshold of military engagement was crossed with the Turkish Armed Forces invading and violating the sovereignty of Cyprus. A fully fledged military clash was averted because of the collapse of the military junta regime in Athens which had left the Greek Armed Forces in disarray, but also thanks, in large part, to Washington's diplomatic intervention. Since then, Greece and Turkey have engaged in a costly and protracted arms race in their matching efforts to achieve a favorable balance of power. For Athens, deterrence of Turkey's perceived revisionism has been a vital feature of its national security doctrine (Ifantis 2009:183).

Following the invasion and subsequent occupation of the northern part of Cyprus by Turkey, an ever-present prospect for crisis has been a recurring theme in the Greek-Turkish interaction. In 1976, 1983, 1987, 1996, 1998–99, and 2019–20 crises erupted in the Aegean and Eastern Mediterranean that in at least three case brought the two countries near the brink of war. To be sure, there have been short periods of denouement, but the two sides failed to reach a lasting reconciliation. This was due in part to the lack of domestic consensus in both countries. Strong criticism by opposition forces in both Ankara and Athens painted a picture of any accommodation being asymmetrical, almost a sellout of national interests to a historical adversary. Enmeshed in a zero-sum culture, both political systems and societies remained trapped in cycles of tension and détente (Ifantis 2009:183–4).

In the view of most of Greek foreign and defence policy elites, Turkey has been pursuing a calculated revisionist policy in the Aegean, Thrace, and Cyprus. In the 2010s, following Ankara's regional awakening, remaking the Eastern Mediterranean and the Middle East according to neo-ottoman perceptions of regional ordering has meant that its revisionist outreach has acquired a new geopolitical dimension (Saracoglu 2018:17–26). In Greek public discourse, this reflects a grand strategic consensus. Turkey's perceived revisionist stance is highlighted by unacceptable claims with respect to the Aegean and Eastern Mediterranean continental shelf and Exclusive Economic Zone(s) delimitation, breadth of territorial waters, breadth of air space, status of islands, rocks and other maritime features, demilitarization of Greek islands, irregular migration and refugee flows etc. Turkish claims, unilateral activities and policies are seen as a strategic attempt to, in effect, create an enclave of most Greek islands, while suggestions for shared sovereignty and resource utilization in Eastern Mediterranean and the Aegean are seen as part of long-term planning to 'Finlandize' Greece and Cyprus (Ifantis and Triantaphyllou 2018). The August 2020 standoff between the two navies is the latest act of the Greek-Turkish tug of war.

In the wake of this standoff, the EU's desperate quest for de-escalation led to an agreement for the resumption of Exploratory Talks.[1] Since the 1970s, Greece has emphasized its readiness to negotiate with Turkey on demarcating continental shelf and maritime zones, but with one major precondition: A commitment by Turkey to allow the International Court of Justice (ICJ) to arbitrate should the

negotiations fail to reach an agreement. So far Ankara has refused to recognize the jurisdiction of the ICJ. At this juncture it is hard to imagine a breakthrough.

Theory

Greek – Turkish Military Build-Ups

Despite being NATO allies, Greece and Turkey are traditional adversaries (Sezer 1991; Ifantis 2018). This enmity has influenced bilateral relations and military spending. Greece and Turkey consistently rank amongst the countries with the highest military spending as a share of GDP in NATO and Europe (Kollias 1996; Gürsoy 2018). Unsurprisingly, the two countries share the two top spots for average population under arms in NATO (Gürsoy 2018). The shared NATO membership did little to thwart the Greek-Turkish dispute. To the contrary, evidence suggests that common NATO membership has undermined Greek-Turkish relations. Specifically, Krebs (1999) argues that the mitigation of the Soviet threat due to NATO membership exacerbated regional disputes and the alliance's forums presented a new sphere of competition among Greeks and Turks. Similarly, the Turkish EU accession process instigated a thaw in Greek-Turkish relations during the 2000s (Ifantis 2004), but the positive climate did not last as the process was halted. On the domestic front, hard-line veto players on both sides of the Aegean prevent a negotiated settlement to the dispute (You 2016).

The Greek-Turkish dispute has manifested at different points in time into an arms race. Alas, Greek military spending appears to emulate changes in the Turkish military spending, at least for the years 1950 to 1999 (Avramides 1997; Kollias and Paleologou 2002). When considering a defence policy shift in 1985[2], Kollias and Makrydakis (1997) also find evidence of an arms race between Greece and Turkey for the same time period. Simultaneously, Turkish violations of the Greek airspace are associated with higher military spending by the Greek government for years 1985–2001 (Kollias 2004). Therefore, evidence suggests that tensions among the two countries influence military spending. However, while Turkish military spending is driven solely by security concerns, Greece decision-making on military spending is more restricted due to its European Monetary Union membership (Waszkiewicz 2016). Moreover, the 2009 financial crisis has further limited the ability of the Greek government to direct resources to national defence (Kollias, Paleologou, and Stergiou 2016). Previous studies have emphasized the economic effects of this arms race, particularly the negative effect of high military expenditure on the Greek economy (Antonakis and Karavidas 1990; Antonakis 1997; Dunne and Nikolaidou 2001; Athanassiou et al. 2002; Andreou et al. 2002). Furthermore, while most of the Greek military budget covers personnel salaries, Turkey invests more than a quarter of its military budget in research & development or armament purchases (Waszkiewicz 2016:36). Additionally, early privatizations and foreign joint ventures bestowed a qualitative advantage on the Turkish arms industry compared to its unproductive, state-owned Greek counterpart (Brauer 2002). Consequently, even if the Greek-Turkish dispute has escalated at times to an arms race, the two states have different military priorities.

Greek Military Spending and Deterrence

Turkey is Greece's main competitor. By the 1970s, Turkey had replaced the Warsaw Pact countries as the greatest threat to Greek national security and sovereignty (Platias 1991; Avramides 1997; Kollias 1996; Athanassiou et al. 2002; Ifantis 2018). As a result, Greece invests heavily in its armed forces to deter its sizeable neighbour. Military forces can deter a potential aggressor by a) increasing the uncertainty and costs associated with conflict, b) increasing the probability of a successful defence and thus forcing the aggressor to dedicate more resources to the cause, and c) threatening a costly retaliating strike (Huntington 1983–4: 35–36). As such, potent military capabilities are an integral part of any deterrence strategy (Haffa 2018:96, see also Sorokin 1994; Huntington 1983–4; Chiabotti 2018). To deter a potential aggressor, states need ¨*Military forces able to carry out plausible military*

threats to retaliate in an unacceptable manner or to deny an enemy's objectives¨ (Haffa Jr. 2018:96). Therefore, military spending, especially towards aerial firepower, is inextricably linked with a state's defensive military capabilities and its ability to deter foreign threats (Kollias 1996; Betts 1985). For instance, higher defence expenditures allow for the acquisition of more advanced military technology (Pamp and Thurner 2017, Sechser and Saunders 2010) and improve civil-military relations (Leon 2014, Powell 2012) while to increase the armed forces' professionalism and tactical sophistication, it is similarly necessary to invest in higher salaries, regular multi-service military exercises, or the establishment of military academies. In contrast, decreases in military spending mean not only that the armed forces do not acquire new hardware, but that they may also struggle with maintaining their existing weaponry.

Since the primary threat to Greek national security comes from within NATO, the country had to develop its own military capabilities to defend its sovereignty (Kollias 2004; Dokos and Kollias 2013). Additionally, due to demographic disadvantages, Greece had to rely on the capital intensity of its military to match the Turkish quantitative military advantage (Kollias 1996). Being NATO partners, Greece and Turkey also had to compete for resources in the form of arms transfers (Constas 1991:131). The fact that Turkey received more arms transfers within NATO despite its superior military capabilities created more difficulties for Greece and amplified the state of uncertainty in bilateral relations (Krebs 1999:366). Most members of the Greek diplomatic-military elite perceive Turkish aggression in the Aegean as the manifestation of a diachronic, rationalist strategy to alter the status quo in the region (Karakasis 2019). The Turkish threat also explains why the end of the Cold War did not result in reductions in the Greek military budget (Antonakis 1997; Kollias 2004).

Violations of the Greek airspace inflict substantial political costs upon the Greek government. Airspace incursions 'violate the sovereignty of that [target] state' and thus allow 'powerful states to project their power and protect their interests at a distance' (Williams 2010:52). As such, consistent Turkish violations of the Greek-claimed airspace gradually diminish Greece's authority over this territory and lend credibility to Turkish claims to shared sovereignty (Ifantis and Triantaphyllou 2018; Karakasis 2019). Airspace violations can thus weaken Greek and strengthen Turkish claims to the contested territory, also signalling Greece's lack of ability or resolve to respond in kind to challenges against its sovereignty. Additionally, airspace violations also impose domestic costs on the ruling government. The territorial dispute with Turkey remains a salient issue in the Greek public, meaning that citizens will see continued and unanswered incursions as a foreign policy defeat and as showing an inability to defend national sovereignty, a view that will hurt the government in the polls (Fang and Li 2020).

Given their costs, Greek governments thus have clear incentives to deter Turkish airspace incursions. For this deterrence to work, Greece needs to signal that it has the capabilities to credibly react in a way that is costly for Turkey. High military expenditures correspond to increased opportunities for Greece to escalate a dispute because its armed forces are more capable of inflicting significant costs on Turkey, thus deterring challenges to its sovereignty. Additionally, high military spending increases the operational capabilities of the Greek air force, providing it with the necessary resources to support an increased number of interception missions as well as state-of-the-art aircraft and pilots. Consequently, high military expenditures increase the capabilities of the Greek military to intercept airspace violations and inflict significant costs in the event of an escalation thus deterring revisionism in the Aegean. However, when military expenditures are consistently declining, Turkey will be less likely to fear a strong reaction by the Greek armed forces because the balance of power is increasingly favourable. Hence, reductions in the Greek military expenditure signal to Turkey that Greece is becoming weaker and will be more hesitant to respond to challenges with military escalation, especially low-level violence like airspace violations. Specifically, reductions in the Greek defence budget limit the Greek air force's ability to intercept Turkish airspace violations. Aircraft interceptions are costly since the Greek air force needs to constantly have combat ready units to immediately respond to violations in a sizeable island chain. As a result, reductions in the budget incentivize

a more selective approach towards interceptions to save resources, thus signalling to Turkey further operational weakness. Subsequently, reductions in military expenditure signal to Ankara that Greece does not have the military means to keep up with day-to-day violations or to answer decisively with a military escalation thus increasing the attractiveness of a revisionist policy.

To summarize, states with higher military spending are better equipped to deter aggressors since they have more advanced military arsenals. If the military budget suffers cuts then the armed forces will not have the necessary equipment, like UAV or air-defence, to deter foreign threats. As a result, cuts in the Greek defence budget limit the ability of the Greek military to deter Turkish aggression. Cuts in the Greek military spending insinuate that her armed forces cannot deter Turkish incursions in the Greek-claimed airspace as reliably as they used to because of reductions in equipment or operations. Athens seems to be aware of this predicament and is attempting to restore its deterrent capacity by increasing military expenditures by 57% in 2021 compared to the previous budget (Panoutsopoulou 2020). Consequently, when a state's military expenditure is decreased, its deterrent capabilities decline as well. We thus expect a reduction in Greek military expenditures to coincide with increased Turkish violations in the Greek airspace.

H1: Decreases in Greek military spending increase airspace violations.

Turkish Military Spending and Assertive Foreign Policy

Despite not being a top security priority, Greek-Turkish relations are still regarded as a serious external threat in Ankara (Gürsoy 2017:6). The Aegean dispute, especially contests over territorial waters and airspace, is present in every Turkish National Security Policy Document (Gürcanli 2014). Moreover, a series of surveys between 2017 and 2019 reveal that 43.2% of Turks consider Greece a threat to Turkey and 59.7% oppose mending the Greek-Turkish relations (Aydin et al. 2020:66–69). The importance of Greece in Turkish strategic considerations is also evident from the increased number of airspace violations throughout the last decade. Violations of the Greek-claimed airspace offer significant benefits to Ankara, both internationally and domestically. In the international arena, the continued Turkish objection to the status of the Aegean islands will be helpful for future negotiations or arbitration since they act as a proof of Turkish claims in the region. Additionally, airspace violations bring the issue of territory on the bilateral agenda to force Greece to acknowledge the dispute over the island status and engage with it. What's more, airspace incursions serve as Ankara's direct challenge to Greek sovereignty over the area and are seen as part of long-term planning to 'Finlandize' Greece and Cyprus (Williams 2010; Ifantis and Triantaphyllou 2018). Internationally, the airspace violations thus serve as a tool to project Turkish sovereignty claims on the contested territory. Domestically, the incursions may allow the ruling party to gain points with its constituents. Particularly in the last years, the AKP has become challenged electorally and had to accept the ultranationalist MHP as junior coalition partner (Ulgen 2018). Likewise, the Turkish economy has stagnated and inflation is soaring. In such times of domestic challenges, governments have an incentive for diversionary behaviour, and given the historic rivalry, Greece is a particularly likely target for Turkish acts of diversion (Mitchell and Prins 2004; Mitchell and Thyne 2010, Tir 2020). To that end, Mehrl and Choulis (2021) find that the number of Turkish incursions in the Greek-claimed airspace increases when leader approval ratings are low. Incursions into the contested airspace may thus also serve as acts of diversion for Ankara, benefitting its domestic position. Turkish incursions in the Greek claimed airspace also enable the Turkish armed forces to gather data on Greek air defences, such as response times, that may be useful for future military endeavours. Consequently, as long as the risk of an escalatory response is sufficiently low, the costs of Turkish airspace incursions, namely operational costs and potential accidents, are outweighed by the benefits.

While the literature concedes that Turkey has been the superior military power (Brauer 2002:103; Kollias 1996),historical military superiority does not explain variations in the tensions between the two states. Turkey has always been the superior military power, more so after the Cold War. A close inspection of Figure 1 reveals that Turkish military spending has skyrocketed since 2013. Nevertheless, the Turkish air force also suffered severe personnel cuts under the 2016 state of emergency. Following the 2016 coup, the ratio of pilots to combat planes in the Turkish air force dropped from 2 to 0.8 pilots per plane (Gürcan 2016). At the same time, the expansion of the Turkish arms industry has improved the military's ability to acquire new weapons and technologies (Bağcı and Kurç 2017).[3] Consequently, despite the reduced ratio of pilots to combat planes, the Turkish armed forces can still credibly threaten the Greek airspace due to increased military spending. The substantial increase in the Turkish defence budget equipped Ankara with advanced technologies, like UAVs, missile systems, and aircrafts, that boosted its confidence in the fighting capabilities of its armed forces. Additionally, the increased military spending coincided with the side-lining of the diplomatic corps and introduced a new security doctrine that embraces the pre-emptive use of military power in disputes (Haugom 2019:211; Aydin 2019). Therefore, increasing military expenditures build confidence and indicate to the Turkish leadership that the risk of airspace incursions is low because Greece will be less willing to escalate when Turkish defence expenditures are rising. In this context, it is also useful to observe that Turkey's 2015 downing of a Russian jet occurred after continuous increases in military expenditures for over a decade had built up Turkish military capabilities.

Hence, increased military expenditures have amplified the military capabilities of the Turkish armed forces. States with high military budgets generally have more advanced equipment or more mechanized units and their armed forces are generally more threatening than those of states with small military budgets. The new armaments available to the Turkish military confirm this position (Gürsoy 2017). Therefore, as states increase military spending, they increase their fighting capacity and can more reliably deter foreign aggression or impose their policies on weaker states. Subsequently, when Turkish military expenditures increase, we expect Turkish incursions into the contested airspace to increase as well. Increases in the Turkish military budget provide palpable evidence to Turkish decision makers that the balance of power is in their favour, Ankara therefore doubles down on the policy of airspace violations.

H2: Increases in Turkish military spending increase airspace violations.

Research Design

To examine our hypotheses, we use data on Turkish incursions into Greek-claimed airspace and on both country's military expenditures. The Airspace contestations data was originally collected by the Greek military and we obtain a yearly timeseries for the period 1985–2015 from Soldatos (2016). We extend this time series to also include the years 2016–2019 using data reported by the Greek military (Hellenic National Defence General Staff 2020).

To measure our main independent variables, we employ data on Greece's and Turkey's yearly absolute military expenditures, measured in constant 2018 US$, which are obtained from SIPRI (2020). This is in line with much of the literature on the Greek-Turkish arms race (see Kollias 1996: 222; Brauer 2002: 88) and captures a state's commitment to state-of-the-art equipment and quality training for its armed forces. Additionally, absolute military expenditure serves as an objective criterion of the military capabilities of two states. Figure 1 presents a first view of the over-time developments of reported airspace violations as well as Greek and Turkish military expenditures. Unsurprisingly, the figure makes clear that Turkey has consistently outspent Greece in terms of its military expenditures. At the same time, the figure also suggests that Turkish military expenditures and airspace incursions, at least for large parts of the period under observation, move together. In

contrast, the picture regarding the hypothesized negative relationship between Greece's military expenditures and infringements of its airspace is less clear, at least for the pre-2010 period.

In a next step, we test our hypotheses more formally employing time-series regression models with ARMA disturbances (see e.g. Box-Steffensmeier et al. 2014), we use heteroskedasticity-robust standard errors. For this, we log-transform the yearly counts of airspace infringements. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests cannot reject the null hypothesis that the logged count of airspace violations is a nonstationary variable; however, this can be rejected after differencing the time series. To select appropriate autoregressive (AR) and moving-averages (MA) terms for the time-series, we use partial autocorrelation plots as well as a comparison of the quality of different models which vary on their ARMA structure. Based on this process we ultimately choose those models which minimize both Akaike's (AIC) and Schwarz's Information Criteria (BIC). We thus include an AR(1) as well as MA(1) and MA(2) terms. In addition to these terms which account for temporal dynamics as well as our independent variables of theoretical interest, Greece's and Turkey's log-transformed military expenditures, we also include a number of additional variables in our models to control for potential confounders that may correlate both with the rivals' military spending and the number of Turkish excursions into Greek airspace.

Table 1. Summary statistics.

Variable	Observations	Mean	Std. Dev.	Min	Max
ln Airspace Violations	35	6.841	.887	5.165	8.479
ln MilEx Turkey$_{y-1}$	36	9.258	.297	8.67	9.943
ln MilEx Greece$_{y-1}$	36	8.784	.177	8.493	9.172
ln GDP pc Turkey$_{y-1}$	35	9.421	.293	8.960	9.960
Erdoğan	36	.472	.506	0	1
Election Turkey	36	.361	.487	0	1
Gas Dispute	36	.056	.232	0	1

Table 2. Military expenditures and airspace incursions – ARMA models.

Dependent Variable:	(1)	(2)	(3)	(4)
ln Airspace Violations				
ln MilEx Turkey$_{y-1}$	0.291**	0.619***	0.616***	0.627***
	(0.140)	(0.233)	(0.235)	(0.232)
ln MilEx Greece$_{y-1}$	−0.524***	−0.559	−0.546	−0.566
	(0.173)	(0.360)	(0.397)	(0.388)
ln GDP pc Turkey$_{y-1}$		−0.133	−0.141	−0.131
		(0.595)	(0.575)	(0.576)
Erdoğan		−0.123	−0.116	−0.116
		(0.271)	(0.255)	(0.253)
Election Turkey			0.0243	0.0319
			(0.150)	(0.156)
Gas Dispute				−0.0858
				(0.139)
AR(1)	−0.664***	−0.708***	−0.715***	−0.719***
	(0.143)	(0.148)	(0.163)	(0.169)
MA(1)	0.264*	−1.35e-06	−3.97e-07	1.26e-09
	(0.157)	(1.24e-06)	(1.26e-05)	(1.75e-05)
MA(2)	−0.736***	−1.000***	−1.000***	−1.000***
	(0.157)	(1.29e-06)	(2.51e-06)	(1.52e-05)
Constant	1.994	0.574	0.547	0.527
	(2.442)	(6.766)	(6.801)	(6.769)
σ	0.452***	0.371***	0.371***	0.371***
	(0.0729)	(0.0512)	(0.0515)	(0.0518)
Observations	34	34	34	34
Log Likelihood	−22.51	−17.15	−17.13	−17.09
Start	1986	1986	1986	1986
End	2019	2019	2019	2019

Note: Robust standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

First, the Turkish government may follow diversionary motives in its use of airspace incursions, i.e. it may seek to use them to boost its support when facing domestic problems (see e.g. Mitchell and Prins 2004; Suzuki and Loizides 2011; Mehrl and Choulis 2021). We account for this by including Turkey's economic performance in the previous calendar year as well as a dummy indicating whether Recep Tayyip Erdoğan was the country's leader in a given year. Existing studies suggest that economic problems can trigger diversionary conflict (e.g. Fordham 1998; Mitchell and Prins 2004) while also pointing to a link between the economy and military spending, we thus control for Turkey's log-transformed GDP per capita in standardized Lira, which we take from the World Bank (2019). At the same time, it is possible that Erdoğan is 'structurally different' than previous leaders as he has now ruled for seventeen years since taking prime ministerial office in 2003 whereas that position was held by eight different individuals in the seventeen years before. In addition, we also control for other relevant domestic or bilateral political events that may affect Turkey's propensity to engage in airspace incursions. First, we include dummy variables which take the value 1 if elections take place in the year under observation. And second, the gas dispute in the eastern Mediterranean has intensified tensions between Greece and Turkey, leading us to include a binary item which is one for the period after the dispute's onset in October 2018. Table 1 presents descriptive statistics for all variables detailed here.

Results

We present the empirical results of the yearly time-series analyses in table 2. Model one includes only Greek and Turkish military expenditures as well as the AR and MA components which account for time dynamics. Models two-four then add control variables with model four being the most completely specified one.

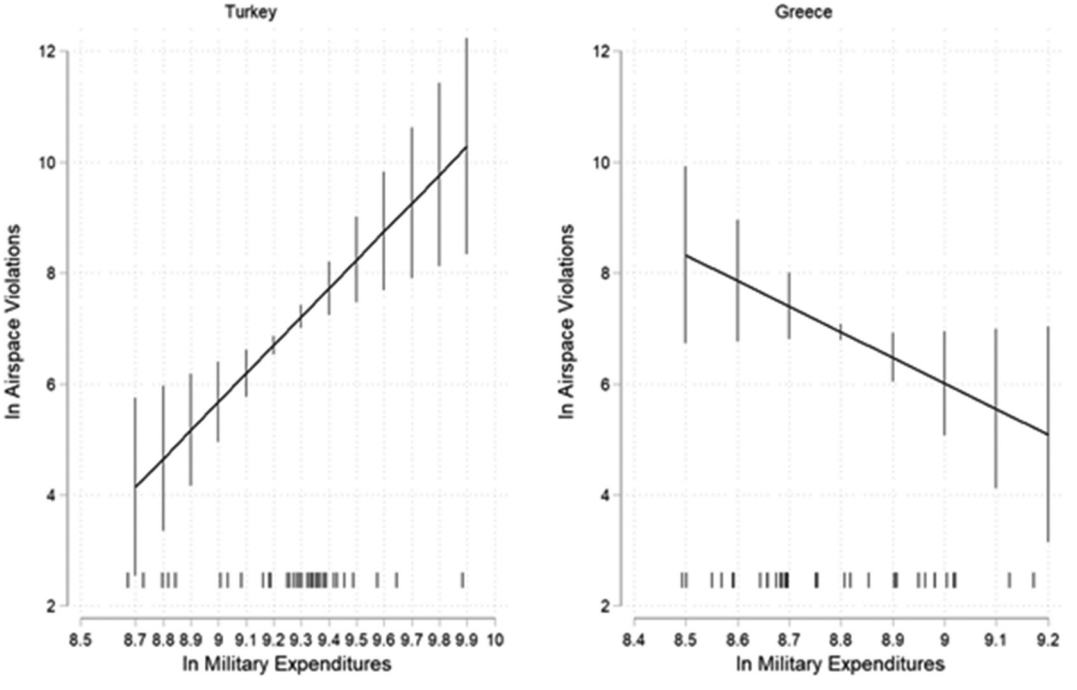

Figure 2. The country-specific effect of military expenditures on airspace incursions. Note: Plots show the predicted level of airspace violations across the range of both countries military spending with all other variables at their observed values. Spikes indicate 90% Confidence Intervals; Rug plots indicate distribution of observations.

Given that both the dependent variable and the independent variables of interest have been log-transformed, we can directly interpret their coefficients as the percentage change in airspace violations for a one-percent increase in military expenditures. The results presented in table 2 offer partial support for the hypothesized effect of military expenditures on airspace infringements. On one hand, the coefficient for *ln MilEx Turkey*$_{y-1}$ is consistently positive and statistically different from zero in all four models, indicating that increases in Turkish military spending result in more flights into Greek-claimed airspace. Based on model four, a 1%-increase in Turkey's military expenditures is associated with a 0.6%-increase in airspace violations. On the other hand, the coefficient for *ln MilEx Greece*$_{y-1}$ is consistently negative, suggesting that a 1%-increase in Greek military spending is associated with a ~ 0.5%-reduction in incursions into its airspace, but only achieves statistical significance in model one. Models one-four thus offer support for the hypothesis that Turkish military expenditures are positively associated with airspace violations but are not in line with the expectation of a negative relationship between Greece's military spending and such violations. None of the four control variables are found to have a statistically significant effect on airspace incursions.

To interpret the results on military expenditures more substantively, we plot, based on model four, the predicted level of airspace violations across both countries military spending in Figure 2. This indicates that moving from the minimum to the maximum amount in observed Turkish military spending is associated with a steep increase in airspace incursions. In substantive terms, their predicted number is only 62 at the minimal defence spending while it goes on to grow to 1357 at the mean. In contrast, doing so for Greek military expenditures is associated with a decline which, however, is less steep and confidence intervals always overlap. Nonetheless, the predicted number of violations is 4122 at the minimum observed military spending and decreases to 1030 at its mean and 162 at its maximum.

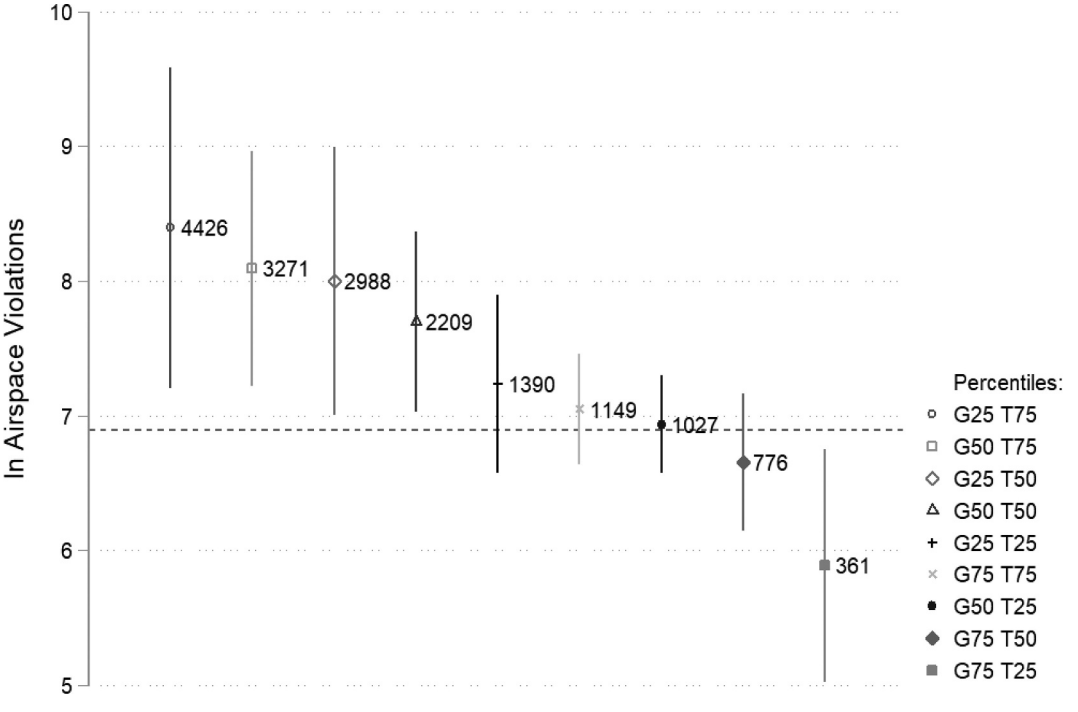

Figure 3. The combined effect of military expenditures on airspace incursions. Note: Plot shows the predicted level of airspace violations across combinations of G(reek) and T(urkish) military spending with all other variables at their observed values. Marker labels indicate (exponentiated) number of airspace violations, spikes 90% Confidence Intervals, dotted line sample-average number of airspace violations.

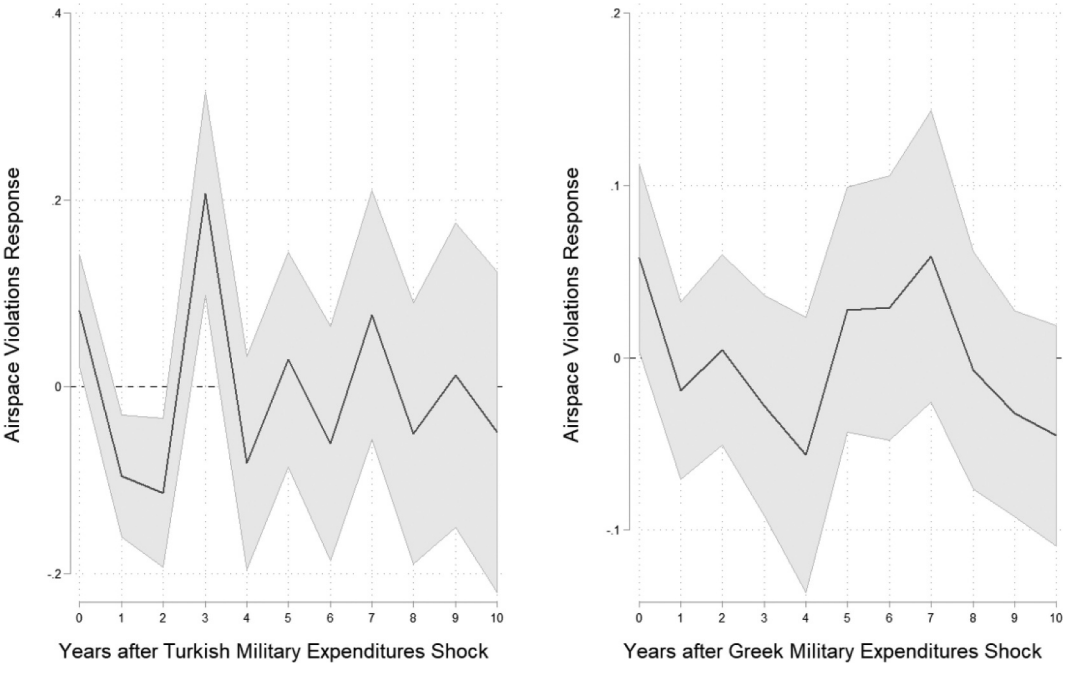

Figure 4. Military Expenditures and Airspace Incursions – Impulse Reaction Functions

These results assume that the respective rival's defence spending remains fixed whereas numerous studies suggest that Greek and Turkey react to each other in their military expenditures (see e.g. Avramides 1997; Kollias and Makrydakis 1997; Kollias and Paleologou 2002). We thus also present the predicted level of airspace violations for specific combinations of Turkish and Greek military spending in Figure 3. This further shows how Turkish defence spending is related to increases in incursions while Greek military expenditures deter them.

Furthermore, the results until now ignore that it is not only possible that military spending affects airspace incursions but that the opposite may be the case or that they even affect each other at the same time. On this point, some previous work has actually found that airspace violations have a positive effect on subsequent Greek military spending (Kollias 2004) whereas elsewhere the effect was found to be insignificant (Kollias, Paleologou, and Stergiou 2016). We thus next address this potential issue by modelling the relationship between airspace violations and Greek as well as Turkish military spending as an endogenous process using Vector Autoregression (Enders 2015). Doing so allows each of the three variables to be affected by past realisations of itself and the other two items as well as exogenous variables. In addition, VAR allows for some degree of contemporaneous effects as we need to establish an ordering of the variables for the purpose of identification (Enders 2015). That is, one variable can be contemporaneously affected by two others, one by only

Table 3. Granger causality tests.

Equation	Excluded	F	df	Prob > F
ln MilEx Turkey	ln MilEx Greece	58.235	6	0.000
	ln Airspace Violations	12.286	6	0.056
ln MilEx Greece	ln MilEx Turkey	29.782	6	0.000
	ln Airspace Violations	45.866	6	0.000
ln Airspace Violations	ln MilEx Turkey	38.25	6	0.000
	ln MilEx Greece	15.145	6	0.019

one other, and finally the third one by none. Given that military expenditures are slow moving and subject to factors such as parliamentary budget control, it appears unlikely that airspace violations have a contemporaneous effect on them but that incursions are instead affected by both countries present military spending. Regarding the ordering of military expenditures, studies of the Greek-Turkish arms race suggest that Turkish military expenditures are more likely to contemporaneously affect Greek military spending than the other way around (Avramides 1997; Kollias and Paleologou 2002) as Greece arguably attributes much more importance to this dispute.[4] Given that ADF and PP tests cannot reject the null hypothesis that airspace violations, but also both Turkish and Greek military spending, are nonstationary processes, we apply Hodrick-Prescott filtering to them to arrive at stationary time-series,[5],,,, (Hodrick and Prescott 1997). ADF and PP test results indicate that filtering resulted in stationarity. To select the appropriate number of lags, we again compare alternative models based on their model quality using information criteria, arriving at a lag order of six. The model further includes the controls used in model three as exogenous variables. Following standard practice, we plot Impulse Response Functions (IRF), showing how one endogenous variable is affected by a shock in the other endogenous variable, for the relationships of theoretical interest to interpret the VAR results and also present results from Granger Causality tests. The associated regression coefficients as well as IRF plots for the other relationships can be found in the appendix.

Most importantly, these results mirror those in table one by indicating that Turkish military expenditures increase airspace violations. The results in table 3 indicate that airspace incursions are granger-caused by Ankara's military spending and the left panel in figure three indicates that a positive shock in that spending translates into a higher number of violations in the same year but also and especially three years down the line. In contrast, the evidence for Greek military expenditures granger-causing airspace incursions is weaker and figure three suggests that any such effect would actually be positive. In addition, the VAR results also offer some support for the idea that airspace violations lead to an increase in Greek defence spending (see Kollias 2004) as the Granger causality test for this relationship is significant and the IRF plot shows a positive short-run effect.

We present the results of additional specifications in the appendix to examine the robustness of our results. These specifications include additional ARMA models where we use relative instead of absolute military spending, employ alternative dependent variables, and control for other variables including the 2016 Coup attempt, domestic fighting and terrorism in Turkey, Greek elections, the Turkish unemployment rate as well as the development of the economic relationship between Greece and Turkey. In addition, we also re-estimate the VAR model with an alternative ordering of the military spending variables, now allowing Greek defence expenditures to affect Turkey's investments in its military. The results of these additional checks provide further support for our main finding that Turkish military spending drives conflict escalation in the form of airspace violations. Similarly, the evidence for any effect of Greek defence expenditures on these incursions remains mixed; however, we do find evidence that Greece's military spending is negatively associated with aerial engagements between Turkish and Greek planes. Among the other covariates, only Turkey's unemployment rate is found to have a significant effect on air space violations. Figure 4This result that incursions increase together with domestic unemployment is line with the idea that these actions also serve diversionary goals (Mehrl and Choulis 2021).

Conclusion

Undoubtedly, Greek-Turkish relations have deteriorated throughout the past decade. Events like the gas discoveries in the eastern Mediterranean, the Libyan-Turkish maritime agreement, or the territorial demarcations between Greece and Egypt have intensified the Greek-Turkish dispute over the control of the Aegean Sea and eastern Mediterranean. In this study we captured the rising military tensions between the two states with the number of violations of the Greek-claimed airspace by the Turkish air force. Furthermore, we drew attention to the influential role of national military capabilities on military tensions. Specifically, we theorized that a decrease in Greek military expenditures would increase the

number of airspace violations due to the resulting decrease in Greek deterrent power. We also argued that an increase in Turkish defence spending would increase the number of airspace violations as Turkish military capabilities would benefit from new armaments and advanced technologies. The results of a yearly time-series analysis provide support to our expectations, suggesting that changes at least in Turkish military expenditures influence airspace violations. Therefore, the two states' military build-ups seem to affect the level of military tensions in this territorial dispute.

Our findings produce important policy implications that demand the attention of the academic community and policy experts. First and foremost, cuts in the Greek defence budget may be perceived as a sign of weakness and result in an increased number of airspace violations. Considering Greece's financial predicament, we do not recommend an increase in military expenditure, but it is necessary for the country to re-configurate its armed forces and dedicate funds to state-of-the-art military equipment, possibly by changes in its conscription system. Additionally, the Turkish case demonstrates that low levels of use of force, like airspace violations, can be effective at promoting political goals, like challenging the territorial status quo. Through an incremental increase in airspace violations, a challenger may establish a new status quo without resorting to an armed conflict. And finally, our results suggest that third countries' armaments sales to the conflict parties, for instance Turkey's procurement of the Russian-made S-400 air defence system or France providing frigates for Greece's planned Navy enlargement, have the potential to escalate conflict between the two rivals.

With regards to future research, changes in the military capabilities may be applied as a theoretical framework to explain rising tensions in other territorial disputes around the world, like the Sino-Indian border dispute. What's more, future researchers may want to address how actors outside of the government, like the media or nationalist parties, force leaders to escalate a low intensity conflict into a full-scale military confrontation, like the 1996 Imia/Kardak crisis. Moreover, the longevity of the Greek-Turkish territorial dispute calls for a thorough investigation of how political actors may exploit this dispute to improve their position within their respective political system. To conclude, changes in military expenditure explain to a large degree the rising number of airspace violations in the Aegean. This previously unknown relationship between military expenditure and low intensity use of force offers significant insight into the complex sphere of Greek-Turkish affairs and interstate territorial disputes, but more work is needed to fully explore the relationship between armaments and conflict over territory.

Notes

1. Since 2002, Greece and Turkey have held 60 rounds of inconclusive 'exploratory contacts' for informal negotiations on the continental shelf.
2. This policy shift refers to the austerity policy employed by the Greek government in 1985 and led to military budget cuts (Kollias and Makrydakis 1997).
3. For more information on Turkish defense procurements planned for the years 2017–2021, see Gürsoy (2017):20.
4. However, we show in the appendix that this ordering decision does not affect our substantive results.
5. The filter's smoothing parameter is set to 6.26 as we use annual data (Ravn and Uhlig 2002). We choose to filter the timeseries instead of differencing them as this does not erase long-term dynamics from the original time series (see Box-Steffensmeier and Smith 1998; Granger and Joyeux 1980).

Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the author(s).

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Table 1. Unit root tests for *In Airspace Violations.*

	d = 0		d = 1	
	Z(t)	**p-value**	**Z(t)**	**p-value**
ADF test	−1.637	0.464	−7.026	0.000
PP test	−1.436	0.565	−7.362	0.000

Table 2. Model fit for different ARMA structures.

	AIC	BIC
AR(1)	64.28861	71.92041
AR(2)	61.69857	70.85673
AR(3)	63.53895	74.22348
MA(1)	59.55813	67.18993
MA(2)	58.84708	68.00525
MA(3)	60.9348	71.61932
AR(1), MA(1)	59.06061	68.21877
AR(2), MA(1)	61.51022	72.19474
AR(3), MA(1)	62.3518	74.56268
AR(1), MA(2)	*57.02798*	*66.18615*
AR(1), MA(3)	58.81189	69.49641
AR(2), MA(2)	60.19519	72.40607
AR(2), MA(3)	58.6098	70.82068
AR(3), MA(2)	61.97451	75.71175
AR(3), MA(3)	60.85481	76.11842

Note: Italics indicate chosen model with lowest AIC and BIC.

Table 3. Unit root tests for *ln military expenditures*.

	Turkey		Greece	
	Z(t)	**p-value**	**Z(t)**	**p-value**
ADF test	−0.338	0.920	−1.376	0.594
PP test	−0.518	0.889	−1.806	0.378

In this appendix, we provide further descriptive statistics, supplementary tests, and a series of additional analyses that complement and further support the main article's findings. These include the following sections:

(1) Diagnostics for the ARMA models.
(2) Diagnostics for the VAR models.
(3) Results table for the main VAR specification.
(4) Additional ARMA specifications: Relative Military Spending.
(5) Additional ARMA specifications: Alternative Dependent Variables.
(6) Additional ARMA specifications: Controlling for further political events.
(7) Additional VAR specifications: alternative temporal ordering

A.1 Diagnostics for the ARMA models

In specifying the ARMA models, we checked for the stationarity of the Airspace Violations timer-series. We used augmented Dickey-Fuller (ADF) and Phillips-Perron tests for this which both test the null hypothesis that a time-series contains a unit root, i.e. is nonstationary. Table A.1 presents the results of these tests for *ln Airspace Violations*, indicating that the null hypothesis of nonstationarity cannot be rejected (d = 0). To address this, we difference the time series and for this differenced timeseries, both tests reject the Null on the 99.9% significance level, indicating that the timeseries is now stationary (d = 1).

To select appropriate AR- and MA-terms for our models, we compared models with different ARMA structures based on their Akaike (AIC) and Schwarz's Bayesian Information Criteria (BIC), ultimately choosing the model which minimized both values, hence maximizing model fit. The models used for this procedure otherwise include the variables from main model one.

This process lead us to arrive at including an AR(1)-term as well as MA-terms of order two in the ARMA models, table A.2 presents the AIC and BIC values for all possible combinations involving AR(1)- to AR(3)- and MA(1)- to MA(3)-terms.

Table 4. Unit root tests for filtered timeseries.

	Airspace Violations		Turkey Milex		Greece Milex	
	Z(t)	**p-value**	**Z(t)**	**p-value**	**Z(t)**	**p-value**
ADF test	−6.122	0.000	−5.466	0.000	−3.784	0.003
PP test	−6.476	0.000	−5.527	0.000	−3.696	0.004

Table 5. Model fit for different VAR lag orders.

	AIC	BIC	HQIC
Lag order: 1	−5.27329	*−4.28318*	−4.9632
Lag order: 2	−5.31607	−3.90162	−4.87308
Lag order: 3	−5.14932	−3.31054	−4.57344
Lag order: 4	−5.67777	−3.41466	−4.96899
Lag order: 5	−6.57734	−3.8899	−5.73567
Lag order: 6	*−7.36118*	−4.24941	*−6.38662*

A.2 Diagnostics for the VAR models

For the Vector Autoregression model, we conduct additional diagnostic tests. First, we need to test whether the military expenditures timeseries are stationary and hence also use ADF and PP tests to check for a unit root in them. The results of these tests are presented in table A.3 and clearly fail to reject the null hypothesis that the timeseries is nonstationary for both Greek and Turkish military expenditures.

In the ARMA models, we tackle nonstationarity in the airspace violations timeseries by differencing it. However, this approach is less suitable for the VAR analysis as here, we are interested in the time series' long-term dynamics which are erased when using differencing. We thus instead opt for Hodrick-Prescott filtering which can make a timeseries become stationary while preserving its long-term dynamics (see Granger and Joyeux 1980; Hodrick and Prescott 1997; Box-Steffensmeier and Smith 1998). Because we find no evidence that any of the three timeseries used here is already stationary, we apply the filter to the airspace violations, the Turkish as well as the Greek military spending variables, setting its smoothing parameter to 6.26 as this is annual data (Ravn and Uhlig 2002). In order to check whether filtering successfully stationarized the three timeseries, we again employ ADF and PP tests. The results of these tests checking for unit roots in the filtered timeseries are presented in table A.4 and now reject the null hypothesis at the 99%-level in all cases.

As above, we use information criteria to assess the model fit of different VAR lag orders to ultimately select one which maximizes the fit. Table A.5 thus presents the values these selection criteria obtain for VARs with lag orders ranging from one to six. In addition to AIC and BIC, it also reports the Hannan-Quinn Information Criterion (HQIC). The results indicate that AIC and HCIC favor the specification including up to six lags while the BIC instead favors a lag order of one. We hence opt for the specification with a lag order of six.

A.3 Results table for the main VAR specification

In the article, we only presented Impulse Reaction Function Plots and referred to Granger Causality tests to interpret the VAR. We hence here report both the full coefficient plot and the associated Granger Causality test results for this model in table A.6. We furthermore also present the remaining Impulse Reaction Function Plots here in Figure A.1, these results additionally suggest that increases in airspace violations may lead to higher Greek military spending.

A.4 Additional ARMA specifications: Relative Military Spending

In the main analysis, we rely on the absolute defence spending values of Turkey and Greece. In this section, we instead use relative military spending, i.e. the ratio of Turkish and Greek expenditures. This is done because absolute and relative military spending may capture two distinct facets of deterrence. Along these lines, absolute military spending may be understood to mainly affect the costs an attacking country would suffer due to counterstrikes. But relative military expenditures, due to taking into account both belligerents' spending, may additionally drive the probability of winning a military contest. As such, relative military expenditures may not only deter an enemy from taking aggressive actions but also force it into accepting unwelcome policies. In table A.7, we thus present additional specifications where we replace absolute with relative military expenditures, i.e. $\frac{MilExTurkey}{MilExGreece}$. In line with expectations, airspace violations increase together with Turkey's relative defence expenditures.

A.5 Additional ARMA specifications: Alternative Dependent Variables

In the main analysis, we examine the total number of Turkish incursions into Greek-claimed airspace as our dependent variable. We now us two alternative dependent variables, namely the number of incursions by armed airplanes as well as the number of in-air engagements between Greek and Turkish planes. One may argue that the deterrence effects we theorize should particularly be the case for more aggressive actions such as incursions by fighter jets or engagements between Turkish and Greek planes. And additionally, while Turkey is the only decisionmaker on airspace incursions, the

Table 6. VAR coefficient table and granger causality tests.

	(1)	(2)	(3)
Equation	ln MilEx Turkey	ln MilEx Greece	ln Airspace Violations
ln MilEx Turkey		−0.226	−5.018***
		(0.237)	(1.892)
ln MilEx Turkey_{y-1}	−0.804***	−0.292	−3.880**
	(0.156)	(0.203)	(1.916)
ln MilEx Turkey_{y-2}	−0.648***	0.456**	−10.22***
	(0.165)	(0.214)	(2.028)
ln MilEx Turkey_{y-3}	−0.493***	−0.216	0.243
	(0.138)	(0.178)	(1.688)
ln MilEx Turkey_{y-4}	−0.274	−0.197	−5.841***
	(0.170)	(0.220)	(2.080)
ln MilEx Turkey_{y-5}	−0.499***	0.0278	1.620
	(0.109)	(0.142)	(1.339)
ln MilEx Turkey_{y-6}	−0.0679	−0.282	−2.043
	(0.145)	(0.188)	(1.781)
ln MilEx Greece			−3.194**
			(1.460)
ln MilEx Greece_{y-1}	0.118	0.496***	0.620
	(0.0820)	(0.106)	(1.005)
ln MilEx Greece_{y-2}	0.214***	−0.487***	2.515***
	(0.0795)	(0.103)	(0.974)
ln MilEx Greece_{y-3}	0.155*	−0.295***	0.387
	(0.0812)	(0.105)	(0.995)
ln MilEx Greece_{y-4}	0.371***	−0.0457	0.348
	(0.110)	(0.142)	(1.342)
ln MilEx Greece_{y-5}	0.129	−0.241**	2.329**
	(0.0889)	(0.115)	(1.090)
ln MilEx Greece_{y-6}	−0.0330	−0.203*	1.909*
	(0.0807)	(0.105)	(0.989)
ln Airspace Violations $_{y-1}$	0.0145	0.0364**	−0.522***
	(0.0118)	(0.0153)	(0.145)
ln Airspace Violations $_{y-2}$	0.0171	0.0252	−0.799***
	(0.0121)	(0.0157)	(0.148)
ln Airspace Violations $_{y-3}$	0.00358	0.0501***	−0.509***
	(0.0117)	(0.0152)	(0.143)
ln Airspace Violations $_{y-4}$	0.0292**	0.0456***	−0.654***
	(0.0113)	(0.0147)	(0.139)
ln Airspace Violations $_{y-5}$	0.0252**	0.0242	−0.324**
	(0.0118)	(0.0152)	(0.144)
ln Airspace Violations $_{y-6}$	0.0249**	0.0921***	−0.174
	(0.0116)	(0.0150)	(0.142)
ln GDP pc Turkey_{y-1}	−0.00232	0.0395	−0.261
	(0.0221)	(0.0287)	(0.271)
Election Turkey	0.0211**	−0.0231**	−0.154
	(0.00882)	(0.0114)	(0.108)
Erdoğan	−0.0116	−0.0155	0.0329
	(0.0114)	(0.0148)	(0.140)
Constant	0.0232	−0.357	2.494
	(0.203)	(0.263)	(2.492)
Granger Wald test: χ^2			
ln MilEx Turkey		29.782***	38.25***
ln MilEx Greece	58.235***		15.145**
ln Airspace Violations	12.286*	45.866***	
Observations	29		
Log Likelihood	172.7		
Start	1991		
End	2019		

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

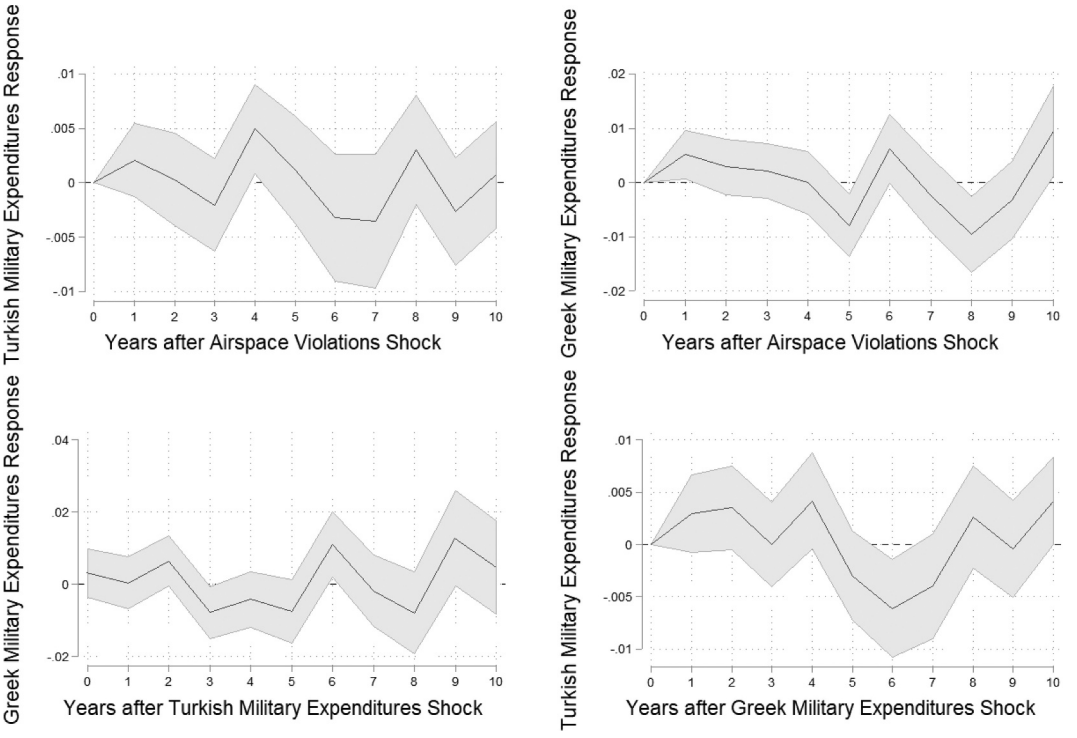

Figure A1. VAR impulse reaction functions. Note: Grey areas indicate 90%-Confidence Intervals.

Greek air force also decides whether to engage with Turkish planes in its airspace. The results of these additional models, using two new dependent variables, are presented in table A.8. In line with our theoretical argument and main findings, these analyses indicate that Turkish defence spending increases aerial incursions. Additionally, we also find that Greek military spending has a statistically significant and negative effect on the number of aerial engagements.

A.6 Additional ARMA specifications: Controlling for further political events

Elections and the ongoing gas dispute in the eastern Mediterranean are important events in Turkey's recent political history. However, they are hardly the only political events that may have affected Greek and Turkish military expenditures as well as airspace violations. For instance, the 2016 coup attempt resulted in a substantial shift in Turkish civil-military relations thus potentially affecting both Turkish military spending as well as air force activity and Greek perceptions of the danger posed by its rival. We thus include a dummy that takes the value 1 if an observation occurred in or after 2016 as an additional control. Similarly, Turkey is also facing a relevant domestic security challenge from the PKK and more severe internal conflict may be correlated with both increased military spending and a decrease in airspace violations. As such, we further add three alternative measures of domestic conflict intensity, namely ln Conflict Events$_{y-1}$, ln Security Force Casualties$_{y-1}$, and ln Terror Attacks $_{y-1}$. The former two measures are coded from Kibris (2020) while the number of terrorist attacks comes from the Global Terrorism Database (LaFree & Dugan, 2007). Additionally, as neighboring countries, Greece's and Turkey's economies are also interrelated to a large degree and one may expect that when trade is high, both airspace violations and military spending may decrease. We thus also include ln Trade Volume$_{y-1}$, as a further additional control which is constructed using yearly import and export values from Correlates of War Trade Data, Version 4.0 (Barbieri, Keshk & Pollins, 2009), and the UN Comtrade Database (2020). We further present a model controlling for Greek election years. And finally, to further probe the effects of Turkey's domestic economy, we include the Turkish unemployment rate (World Bank 2019) in a further model.

We present the results of these additional specifications in table A.9 and A.10, however, our substantive results regarding the effect of military spending remain unchanged throughout. Among the additional covariates, only the Turkish unemployment rate is found to be a relevant predictor of airspace incursions; this result is in line with recent evidence that these acts follow a diversionary logic (Mehrl and Choulis 2021).

Table 7. ARMA results – Relative military spending.

Dependent Variable:	(4)	(5)	(6)	(7)
ln Airspace Violations				
MilEx $Ratio_{y-1}$	0.197***	0.302*	0.316*	0.396**
	(0.0412)	(0.171)	(0.183)	(0.198)
ln GDP pc $Turkey_{y-1}$		−0.0757	−0.0790	−0.176
		(0.635)	(0.641)	(0.648)
Erdoğan		−0.139	−0.149	−0.113
		(0.260)	(0.259)	(0.259)
Election Turkey			−0.0427	−0.0282
			(0.118)	(0.116)
Gas Dispute				−0.311*
				(0.169)
AR(1)	−0.675***	−0.689***	−0.681***	−0.690***
	(0.153)	(0.148)	(0.148)	(0.152)
MA(1)	0.339**	4.96e-06	−1.83e-06	4.38e-06
	(0.161)	(4.69e-06)	(1.97e-06)	(1.05e-05)
MA(2)	−0.661***	−1.000***	−1.000***	−1.000***
	(0.161)	(3.15e-06)	(4.22e-06)	(1.24e-05)
Constant	−0.253***	0.363	0.392	1.160
	(0.0868)	(5.586)	(5.640)	(5.697)
σ	0.463***	0.380***	0.380***	0.375***
	(0.0748)	(0.0477)	(0.0475)	(0.0484)
Observations	34	34	34	34
Log Likelihood	−23.23	−17.98	−17.94	−17.52
Start	1986	1986	1986	1986
End	2019	2019	2019	2019

Robust standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

Table 8. ARMA results – Alternative dependent variables.

	(8)	(9)
Dependent Variable:	ln Armed Airspace Violations	ln Aerial Engagements
ln $MilEx\ Turkey_{y-1}$	0.771**	1.546**
	(0.321)	(0.611)
ln MilEx $Greece_{y-1}$	−0.770	−2.142**
	(0.569)	(0.994)
ln GDP pc $Turkey_{y-1}$	−1.213	−1.701
	(0.946)	(1.526)
Erdoğan	0.0822	0.465
	(0.441)	(0.693)
Election Turkey	−0.194	0.673
	(0.291)	(0.572)
Gas Dispute	0.614*	−0.00993
	(0.366)	(0.479)
AR(1)	−0.818***	0.103
	(0.111)	(0.262)
MA(1)	9.45e-07	−0.686***
	(8.51e-06)	(0.188)
MA(2)	−1.000***	−0.314*
	(8.10e-06)	(0.188)
Constant	11.16	20.09
	(10.83)	(17.41)
σ	0.572***	0.864***
	(0.0752)	(0.111)
Observations	34	34
Log Likelihood	−31.69	−44.78
Start	1986	1986
End	2019	2019

Robust standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

Table 9. ARMA results – Additional political controls I.

Dependent Variable:	(10)	(11)	(12)	(13)
ln Airspace Violations				
ln MilEx $Turkey_{y-1}$	0.624***	0.615**	0.623***	0.622***
	(0.232)	(0.239)	(0.236)	(0.231)
ln MilEx $Greece_{y-1}$	−0.538	−0.563	−0.565	−0.522
	(0.389)	(0.390)	(0.389)	(0.384)
ln GDP pc $Turkey_{y-1}$	−0.155	−0.0817	−0.0867	−0.130
	(0.597)	(0.610)	(0.596)	(0.579)
Erdoğan	−0.116	−0.160	−0.162	−0.113
	(0.256)	(0.300)	(0.292)	(0.257)
Election Turkey	0.0216	0.0135	0.00943	0.0185
	(0.153)	(0.148)	(0.151)	(0.153)
Gas Dispute	−0.180	−0.0729	−0.0638	−0.209
	(0.202)	(0.148)	(0.156)	(0.196)
Coup attempt	0.0855			
	(0.200)			
ln Security Force $Casualties_{y-1}$		−0.0146		
		(0.0449)		
ln Conflict $Events_{y-1}$			−0.0182	
			(0.0503)	
ln Trade $Volume_{y-1}$				−0.00799
				(0.0146)
AR(1)	−0.715***	−0.714***	−0.713***	−0.715***
	(0.166)	(0.159)	(0.159)	(0.166)
MA(1)	−1.55e-07	1.35e-06	−9.08e-07	2.05e-06*
	(7.48e-07)	(5.11e-06)	(3.99e-06)	(1.05e-06)
MA(2)	−1.000***	−1.000***	−1.000***	−1.000***
	(2.46e-06)	(6.13e-06)	(4.03e-06)	(1.83e-06)
Constant	0.538	0.248	0.255	0.228
	(6.819)	(6.927)	(6.865)	(6.684)
σ	0.370***	0.370***	0.370***	0.370***
	(0.0519)	(0.0524)	(0.0525)	(0.0518)
Observations	34	34	34	34
Log Likelihood	−17.06	−17.03	−17.01	−17.04
Start	1986	1986	1986	1986
End	2019	2019	2019	2019

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

A.7 Additional VAR specifications: Alternative temporal ordering

Finally, we check whether the specified temporal order (allowing Turkish military spending to contemporaneously affect Greek military expenditures but not the other way around) affects our substantive results. We thus re-estimate the main VAR specification while turning this temporal ordering around. These additional VAR results are presented in table A.11 as well as Figure A2. However, as can be seen best in Figure A2, our results remain substantively in line with those of the main specification and the ARMA models.

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Table 10. ARMA results – Additional political controls II.

Dependent Variable:	(14)	(15)	(16)
ln Airspace Violations			
ln MilEx $Turkey_{y-1}$	0.505*	0.580**	0.506**
	(0.293)	(0.249)	(0.230)
ln MilEx $Greece_{y-1}$	−0.486	−0.511	−0.432
	(0.431)	(0.329)	(0.352)
ln GDP pc $Turkey_{y-1}$	−0.00246	0.454	0.114
	(0.609)	(0.508)	(0.565)
Erdoğan	−0.141	−0.703**	−0.129
	(0.251)	(0.289)	(0.255)
Election Turkey	0.00853	−0.0896	0.190
	(0.152)	(0.155)	(0.164)
Gas Dispute	−0.0673	−0.725***	−0.0468
	(0.139)	(0.272)	(0.143)
Election Greece	−0.162		
	(0.220)		
Unemployment % Turkey		0.159**	
		(0.0626)	
ln Terror $Attacks_{y-1}$			−0.0483
			(0.0505)
AR(1)	−0.714***	−0.725***	−0.715***
	(0.167)	(0.117)	(0.153)
MA(1)	−1.03e-06	−1.44e-07	−2.88e-05
	(4.99e-06)	(2.56e-05)	(3.82e-05)
MA(2)	−1.000***	−1.000***	−1.000***
	(5.94e-06)	(1.12e-05)	(3.98e-05)
Constant	−0.174	−6.110	−1.733
	(6.988)	(6.046)	(6.002)
σ	0.367***	0.346***	0.353***
	(0.0547)	(0.0522)	(0.0494)
Observations	34	32	33
Log Likelihood	−16.76	−13.97	−15.85
Start	1986	1988	1986
End	2019	2019	2019

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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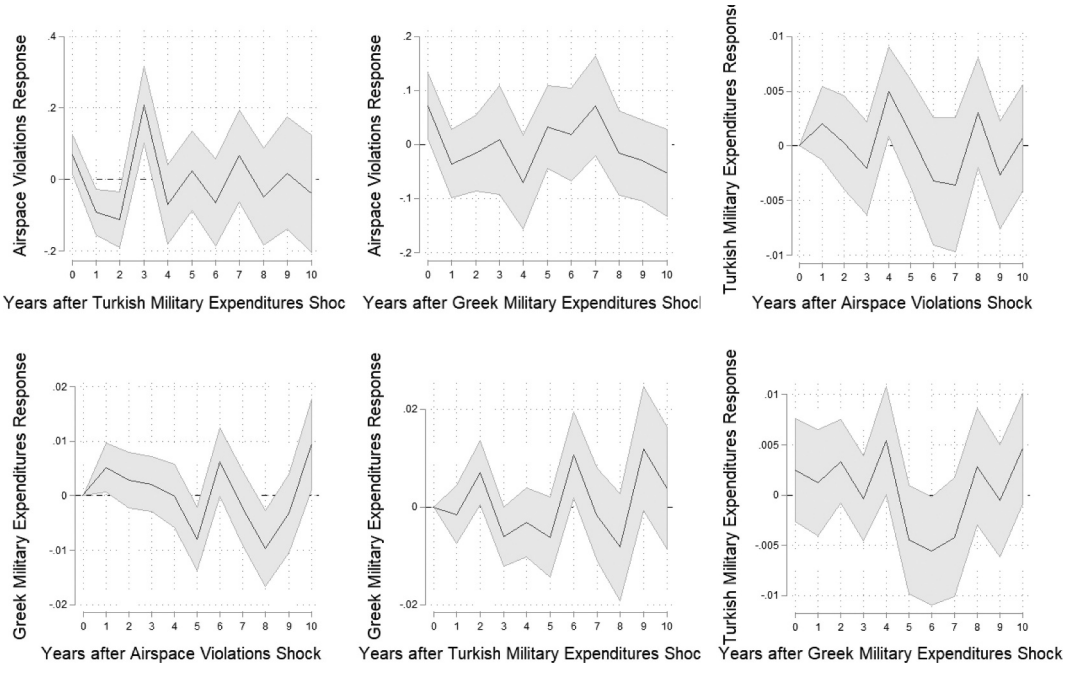

Figure A2. VAR impulse reaction functions. Note: Grey areas indicate 90%-Confidence Intervals.

Table A11. VAR coefficient table and granger causality tests.

	(17)	(18)	(19)
VARIABLES	ln MilEx Greece	ln MilEx Turkey	ln Airspace Violations
ln MilEx Greece		−.135	−3.194**
		(0.141)	(1.460)
ln MilEx Greece $_{y-1}$	0.496***	0.118	0.620
	(0.106)	(0.0820)	(1.005)
ln MilEx Greece $_{y-2}$	−0.487***	0.214***	2.515***
	(0.103)	(0.0795)	(0.974)
ln MilEx Greece $_{y-3}$	−0.295***	0.155*	0.387
	(0.105)	(0.0812)	(0.995)
ln MilEx Greece $_{y-4}$	−0.0457	0.371***	0.348
	(0.142)	(0.110)	(1.342)
ln MilEx Greece $_{y-5}$	−0.241**	0.129	2.329**
	(0.115)	(0.0889)	(1.090)
ln MilEx Greece $_{y-6}$	−0.203*	−0.0330	1.909*
	(0.105)	(0.0807)	(0.989)
ln MilEx Turkey			−5.018***
			(1.892)
ln MilEx Turkey$_{y-1}$	−0.292	−0.804***	−3.880**
	(0.203)	(0.156)	(1.916)
ln MilEx Turkey$_{y-2}$	0.456**	−0.648***	−10.22***
	(0.214)	(0.165)	(2.028)
ln MilEx Turkey$_{y-3}$	−0.216	−0.493***	0.243
	(0.178)	(0.138)	(1.688)
ln MilEx Turkey$_{y-4}$	−0.197	−0.274	−5.841***
	(0.220)	(0.170)	(2.080)
ln MilEx Turkey$_{y-5}$	0.0278	−0.499***	1.620
	(0.142)	(0.109)	(1.339)
ln MilEx Turkey$_{y-6}$	−0.282	−0.0679	−2.043
	(0.188)	(0.145)	(1.781)
ln Airspace Violations $_{y-1}$	0.0364**	0.0145	−0.522***
	(0.0153)	(0.0118)	(0.145)
ln Airspace Violations $_{y-2}$	0.0252	0.0171	−0.799***
	(0.0157)	(0.0121)	(0.148)
ln Airspace Violations $_{y-3}$	0.0501***	0.00358	−0.509***
	(0.0152)	(0.0117)	(0.143)
ln Airspace Violations $_{y-4}$	0.0456***	0.0292**	−0.654***
	(0.0147)	(0.0113)	(0.139)
ln Airspace Violations $_{y-5}$	0.0242	0.0252**	−0.324**
	(0.0152)	(0.0118)	(0.144)
ln Airspace Violations $_{y-6}$	0.0921***	0.0249**	−0.174
	(0.0150)	(0.0116)	(0.142)
ln GDP pc Turkey$_{y-1}$	0.0395	−0.00232	−0.261
	(0.0287)	(0.0221)	(0.271)
Election Turkey	−0.0231**	0.0211**	−0.154
	(0.0114)	(0.00882)	(0.108)
Erdoğan	−0.0155	−0.0116	0.0329
	(0.0148)	(0.0114)	(0.140)
Constant	−0.357	0.0232	2.494
	(0.263)	(0.203)	(2.492)
Granger Wald test: χ^2			
ln MilEx Turkey	29.782***		
ln MilEx Greece		58.235***	15.145**
ln Airspace Violations	45.866***	12.286*	38.250***
Observations	29		
Log Likelihood	172.7		
Start	1991		
End	2019		

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$