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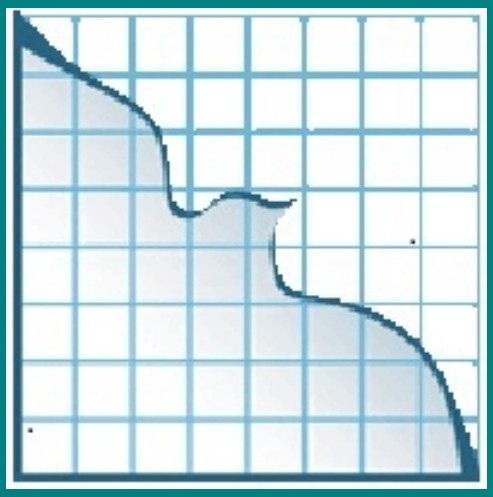

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A rationalist explanation of Russian risk-taking

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Abstract

Three seemingly unrelated topics of Russian politics are investigated. It is shown that under expected utility maximization the assumptions of an unbiased oil forward market and a risk-acceptant attitude (strictly convex utility function) are sufficient to explain Russia's open position in oil and the bailout of Rosneft. The risk-acceptant attitude of the Russian leader also causes a shrunken bargaining range for the conflict in Ukraine, which can be enlarged by sanctions but not necessarily by the proliferation of weapons. This gives sanctions a clear edge over the proliferation of weapons.

The media are filled with reports about Russia's risk taking. Most prominent are reports about the conflict in Ukraine, less noted are reports on Russia's open (unhedged) market risk position in crude oil, and presumably least noted are reports about bailing out certain Russian firms. In this article we establish that all three risk-taking decisions can be explained by one rationalist model. First, we investigate Russia's decision not to hedge its well-known oil price exposure by making use of expected utility theory. Second, Russia's bailout of Rosneft is subsumed under this model. Third, a rationalist explanation is applied to the conflict in Ukraine.[1]

Approaches to international relations

To understand the logic guiding the decisionmaking of Russian president Putin, it is essential to refer to the two main schools of thought in international relations, as this discipline contributes valuable insight into the behavior of states and other actors. We thus briefly discuss the traditions of realism and liberalism, compare them to each other, and then point out where our approach fits in.

The realist school was the predominant stream of international relations thought in the post-world war two era. Massively shaping foreign policy over the last few decades, its origins date back to Thucydides' *Melian Dialogue* which vividly demonstrates the basic assumptions of realism. The conclusion of the dialogue can be summarized as "the strong do what they can and the weak do what they must," reflecting the centrality of the theme of political power as the starting point of all realist theories. Realism emphasizes the constraints on politics imposed by human nature and the absence of international government. Realists, like liberals, assume that politics is governed by objective laws that have their origin in human nature, with the significant difference that realists regard humans as egoic and inclined toward immorality. On the state-level, the main objectives are security and survival, both of which achieved through the deployment of military forces. Combined with the assumption that the international system is anarchic, this creates a security dilemma as each state is primarily motivated by rational national self-interest. As states are the most important actors in international politics, there cannot be a higher authority governing their interactions unless those states transfer their sovereignty in a contractual process to a supranational body.[2]

From this it follows that universal moral principles cannot be applied to the actions of states, and this stands in direct opposition to one of the main goals of liberal theories of international relations. Here the survival of each state depends on its material capabilities and alliances with other states. What realists have in common with liberals is the domestic analogy, just that realists draw this comparison in regards to politics, not law, from which derives a simple answer to the question of order—internationally as well as domestically: effective central authority. Furthermore, realists stress the importance of community to achieve order. This implies that an effective international order can only be achieved among states with similar ideals and values and thus emphasizes the cultural limitations of liberal internationalism.[3]

Liberals' core unit of analysis is the individual, not the state, and the view of this individual is much more optimistic than that of realists. Liberals begin with the assumption that humans innately tend to be good and can be motivated to act altruistically. From this philosophical starting point more diverse options arise for how a society of states can be structured. Liberalism considers a more diverse set of actors to be relevant to international relations and therefore involves

trade as a central element in its approach. One of the founding fathers of liberalism, Immanuel Kant, was among the first to create a holistic theory of peace revolving around the mutual benefits of commerce and, consequently, the implications of military activity for such trade. The basic idea therefore rejects war as a means of solving political conflicts and retreats to diplomacy in the name of reason, peace and progress. Perpetual democratic peace and free trade would make military solutions to conflict obsolete. From this follows the trust placed in international institutions and international law to govern interstate relations. Thus, liberals also draw on a domestic analogy, only that it treats states like individuals. Security is guaranteed collectively, the rule of law enforced internationally, and diplomacy carried out publicly.

Our approach can be subsumed under realism: We take the state as the core unit of analysis and point out the importance of only certain individuals, which we view as acting egoically. By identifying the interests of the Russian state with those of certain individuals, who act rationally, we are—again—in alignment with realism. Furthermore, most characteristics of Russia's recent foreign policy toward Ukraine reveal numerous realist elements. Especially the disregard for international institutions or the systematic abuse of its structural weaknesses, as well as Russia's calculating manner when breaking international law and probing the limitations of its actions motivate a realist approach to international politics. Since we apply an interdisciplinary approach and detail the risk preferences of the main actor, we add something new to the realist approach.

Russia's oil price risk management

The application of expected utility theory to hedging decisions has a long tradition, but its application to international relations is more recent, initiated by Bruce B. De Mesquita. We take two of his original assumptions and apply them to the case of Russian decisionmaking: (1) Decisions are viewed as if they are the product of a single, all important decisionmaker [i.e., the leader] and (2) decisionmakers are rational expected utility maximizers.[4]

Both assumptions can be defended as applicable to the case of Russia. First, according to Russia's chief propagandist "even a decision about the use of nuclear arms 'will be taken personally by Mr Putin'." Nevertheless, Putin has to cope with limitations on his power. It is well-known, for instance, that he cannot afford to lose support of the oligarchs; in fact, certain oligarchs were key in furthering his career. But as long as these few people are not overmuch adversely affected, there is a significant degree of freedom for Putin to decide as he wishes. This is captured by the first assumption.[5]

The media are filled with reports about Russia's risk taking. Most prominent are reports about the conflict in Ukraine, less noted are reports on Russia's open (unhedged) market risk position in crude oil, and presumably least noted are reports about bailing out certain Russian firms. In this article we establish that all three risk-taking decisions can be explained by one rationalist model. First, we investigate Russia's decision not to hedge its well-known oil price exposure by making use of expected utility theory. Second, Russia's bailout of Rosneft is subsumed under this model. Third, a rationalist explanation is applied to the conflict in Ukraine.

Clearly the Russian state takes numerous major actions every year. It is outside the scope of this article to investigate all of them. But the three actions under consideration rank among the most important and can be linked to the Russian president. His involvement in Ukraine goes without saying. Regarding Rosneft and the oil markets, note that one of Putin's closet allies from St. Petersburg, Igor Setschin, is Executive Chairman of Rosneft, an integrated oil company that is majority-owned by the Russian government.[6] We may thus safely assume that Putin is well-aware of Rosneft's positioning in the market and personally interested in the company's fate.

As to the second assumption, two economics Nobel prizes have been awarded regarding theories of decisionmaking under uncertainty, Expected Utility Maximization (EUM) and Prospect Theory (PT).[7] For a number of reasons we prefer EUM. First, Kahneman himself notes that prospect theory does not apply to international relations.[8] Second, the axioms underlying EUM are more convincing to us than those of PT. Take for example the handling of probabilities. Denote the chances to win a war by deploying army 1 by P1 and for using army 2 by P2. Assume that P1 > P2. Under EUM, it is an elementary rule (axiom) that a decisionmaker would then prefer army 1 to army 2. Given a few other axioms, the authors of EUM have shown that there exists a utility function and that finding the optimal decision (e.g., regarding an army) is equivalent to EUM, i.e., picking the one which yields the highest expected utility. In the calculation of expected utility the probabilities would be taken as such, e.g., as calculated by intelligence functions. In contrast, PT applies a weighing function to the probabilities, capturing the notion that people tend to overreact to small probability events and underreact to large probabilities events. It serves to capture people's misunderstandings when coping with uncertainty. But we do not see why Putin should weigh probabilities instead of taking them as such.[9] Now, while one could apply PT without weighing, the initial reference point in the weighing function is a crucial concept of PT which cannot be done without. The problem with the reference point is its arbitrariness. For

instance, it is not clear whether a hedged or unhedged position in oil should be chosen as reference point of the Russian leader. As the choice of the reference point regularly impacts the results of PT, its arbitrariness is seen as a detriment.

Third, EUM is today one of the most important theories in the social sciences. It serves as a tool to prescribe how decisions should be made, given elementary rules of rationality (such as the rank ordering of armies) and scientific journals are filled with EUM applications to derive optimal decisions (on production, hedging, etc.) and, at a minimum, deserve an application to our case. And fourth, for some the rationality of the Russian president might be presumed simply in light of his education as a KGB officer; more convincingly, though, it cannot be ruled out that the conflict in Ukraine is no accident but part of a grand strategy.[10]

Furthermore let us assume as in De Mesquita (1980) that the "leader's welfare" is the argument of the utility function $u(\bullet)$ to be maximized. Since future oil prices are uncertain, the leader maximizes expected utility. The leader's welfare is certainly a function of governmental tax income, which again is a function of the revenues from selling oil. We do not assume that the leader is a steward for the general welfare of his citizenry. Our approach is aligned with a recent, more detailed analysis of Russian foreign policy, which highlights Putin's attempts to avoid Russia becoming a third-rank state. Governmental tax income is a means to buy more and better equipment for Russian troops, which thereby can be ignored less easily.[11]

We denote the amount of the sovereign's oil production by x in units of barrels (bbl) and the uncertain oil price by p in units of U.S. dollars (USD). The leader maximizes the following expected value over a certain time horizon:

$$(1) \qquad E[u(x,p)],$$

where $E[\bullet]$ denotes the expectation operator using the subjective probability distribution as seen by the leader. For exposition, we assume a horizon of one year, which makes x the annual oil production. As a representative of the hedging instruments available we introduce a one-year futures contract, which can be bought or sold at today's known futures price level of f in units of USD/bbl, for instance at the Intercontinental Exchange (ICE).

The leader does not have a "crystal ball" to foresee future oil prices. Many studies have investigated whether oil-futures prices can be treated as expected spot oil prices and have reached a positive conclusion.[12] Hence, we assume that the futures price f is an unbiased estimator of the future oil price p, i.e.:

$$(2) \qquad f = E[p].$$

The last bit of notation is the decision variable h, which is the number of barrels sold forward at the current futures price f. For instance, if the leader chooses to hedge fully, we would have $x=h$. What is effectively chosen is the outcome of the following decision problem of the leader:

$$(3) \qquad max(h)\ E[u(xp + h(f - p))].$$

The only difference to equation (1) is the addition of the profit or loss term from hedging with futures. This simple model implies a proposition for the leader.[13]

Proposition 1:
(i) The leader will hedge fully if he is risk-averse.
(ii) If he is risk-acceptant, a full hedge is the worst decision. Hence, he will leave the oil exposure unhedged.
(iii) If he is risk-neutral, it does not matter whether a hedge is in place.

Non-hedging of Russia's oil exposure could thus be explained by either a risk-neutral or risk-acceptant attitude of the leader. Before this proposition can be applied, however, its unbiasedness assumption, as expressed in equation (2), needs to be defended. In theory this assumption could be checked by asking the Russian leader for his oil-price expectations and comparing them to the current oil-forward price curve. It is clear that this is out of question. As an approximation we look at the expectations expressed by the governor of the Bank of Russia. First, the expected levels were close to the then current futures quotes. Second, leading analysts are quoted by the governor. It is common practice that, where available as liquidly traded instruments, forward prices are taken as best estimates for future spot prices—even by experts.[14]

With this support for the unbiasedness assumption we can now conclude from the proposition that the Russian leader either has a risk-acceptant or a risk-neutral attitude. This intermediate result is next checked against other evidence.

Russia's bailout of Rosneft

The media report that Russia's central bank is accepting corporate bonds issued by Russia's biggest oil company, Rosneft, as collateral from its debtors, i.e., commercial banks.[15] The already big exposure of the Russian banking system to commodity-related companies is thereby increased. By assumption the central bank acts in alignment with the leader.

What does this bailout tell us about the risk attitude of the leader? Certainly, this decision cannot be reconciled with a

risk-averse attitude as this would call for diversification of credit risk, not for its concentration. Risk-acceptant or risk-neutral attitudes again appear as viable candidates to explain the observed behavior.

There are media reports on the specific conditions under which the central bank is taking the bonds as collateral. It is reported that they were taken at face value. The fact that the interest which investors are charging Rosneft on these bonds (i.e., the coupon) is below that of Russian sovereign debt rules out a risk-neutral attitude. In other words, the expected credit loss from holding these bonds is not compensated by the coupon as would be required by a risk-neutral decisionmaker.[16]

Hence, the bailout of Rosneft can neither be explained by a risk-averse nor by a risk-neutral attitude of the Russian leader. This leaves a risk-acceptant attitude of the Russian leader as the best common explanation of not hedging the oil exposure and bailing out Rosneft.

Conflict in Ukraine

Military conflict is inefficient because it destroys resources. Therefore, rational individuals seek to avoid military conflict. It should be noted that this is due only to reasons of efficiency and not of moral principles. Taking the approach by Fearon we show that risk-acceptance can explain why it is especially challenging to find a peaceful solution for the conflict in Ukraine.[17]

Let D be the monetary value of the region under dispute and C_i the costs of war for sovereigns A and B, $i=A,B$. The proportion of the region controlled by A is denoted by Y. Sovereign A prefers Y close to 1 (i.e., 100 percent). The chances to win a war (i.e., to get to $Y=1$) are signified by probability P. Hence, war is a Bernoulli random variable with outcomes $Y=1$ with P and $Y=0$ with $(1–P)$ from the perspective of A.

We take probability P as given and do not try to specify a conflict success function.[18]

In the case of risk-neutrality, sovereign A calculates its expected value of war as:

$$(4) \qquad E[YD–C_A] = PD–C_A.$$

From B's perspective the expected value is:

$$(5) \qquad E[(1–Y)D–C_B] = (1–P)D–C_B.$$

This leads to

Proposition 2: So long as both C_i are positive, there is a negotiable proportion Z, which both sovereigns prefer to war. The monetary amount ZD is in the interval (bargaining range) $(PD–C_A, PD+C_B)$.[19]

Table 1: Bargaining ranges

		Bargaining range with risk-acceptant A		
	Bargaining range under risk-neutrality			
0	$PD–C_A$	$GD–C_A$	$PD+C_B$	1
B's favorite outcome				A's favorite outcome

Note: G is the amount of the certainty-equivalent share of region D.

One surprising insight is that even if sovereign A is sure to win (i.e., $P=100$ percent), there is an interest to avoid the costs of war. This gives B the opportunity to get at least a (presumably rather small) fraction of the region's value, D, or a compensation payment.

So far the proposition sheds light only on the consequences of risk-neutral attitudes of both parties. However, in our case, the interim conclusion has been the leader's risk-acceptant attitude. This gives rise to a third proposition.[20]

Proposition 3: The chances for a negotiated settlement shrink if party A becomes risk-acceptant. The interval (bargaining range) becomes smaller.

It makes sense to identify party A with Russia. This allows to cast current efforts of international politics into the model's framework. A comparison of the bargaining ranges under risk-neutrality and with a risk-acceptant party A is shown in Table 1.[21]

Sanctions on A can be interpreted as an attempt to increase A's cost of war. In our model it is important that the monetary impact of the sanctions must be related to an intended future aggressive action (i.e., no action, no sanction). In this case the threat of sanctions increases cost C_A and widens the interval to the left in favor of B. Thus compensation for the initial bargaining range shrinkage due to party A being risk-acceptant can be achieved. One might object that sanctions also widen the bargaining range for the case of a risk-neutral aggressor. This is true but not the point we want to make. Instead, we highlight that if one has to cope with a risk-acceptant aggressor an extra portion of sanctions can be argued for.

Another model parameter is probability *P*. Advocates of military support for Ukraine might argue that this decreases *P* (Russia's probability of winning). But as stated by German chancellor Angela Merkel there is no amount of military support for Ukraine which would significantly change the odds of war for Russia. Hence, the probability distribution cannot be changed in this special case. But even if the probability distribution could be changed, the interval would not necessarily be enlarged. In addition, sanctions are more manageable than is the proliferation of weapons.

Conclusion

Three seemingly unrelated topics of Russian politics have been investigated. We show that, under expected utility maximization, the assumptions of an unbiased oil-forward market and a strictly convex utility function—representing a risk-acceptant attitude of the Russian leader—are sufficient to explain the open position in oil, the bailout of Rosneft, and the difficulties to settle the conflict in Ukraine peacefully. An additional insight is that the measures taken by Western states have to be more drastic than in the case of a less risk-acceptant leader.[22]

A tentative forecast is that the Russian leader will prefer actions which make the world more unstable to those which do not.[23] This again is a consequence of the risk-acceptant attitude.

The application of an interdisciplinary approach, starting from sovereign commodity price risk management and ending in international politics, can be useful to specify and understand risk attitudes of decisionmakers in international politics.

Notes

1. The model follows the approach by Fearon (1995) and de Mesquita (1980).

2. Realism emphasizes: See, e.g., Donelly (2000, p. 9). Realists assume: See Morgenthau (1948, p. 4). Rational national self-interest: Mearsheimer (1994/95, p. 9) and Gilpin (1996, p. 8). Transfer sovereignty: See Mearsheimer (1994/95, p. 9).

3. Main goals of liberal theories: Again we refer to Morgenthau (1948, p. 6). Survival of states depends on: See, e.g., Waltz (1979, p. 103). Effective central authority: More on this in Lebow (2014, p. 60-61). Liberal internationalism: Again we refer to Lebow (2014, p. 61).

4. Long tradition: An early publication is Ethier (1973). Initiated: De Mesquita (1980).

5. Quote: The Economist (2015).

6. At the time of writing, Rosneft claimed to be the largest publicly listed oil company in the world as measured by barrels of oil produced. If one uses other measures, for instance revenues in 2014, Rosneft's worldwide ranking falls. But what counts here is that Rosneft is Russia's biggest oil company in terms of production.

7. Expected Utility Maximization: Neumann and Morgenstern (1944). Prospect Theory: Kahneman and Tversky (1979).

8. We are grateful to De Mesquita to point this out to us.

9. More specifically, von Neumann and Morgenstern proved that any weighing that is not proportional to the given probabilities leads to inconsistencies in decisionmaking. Also see the hint in Kahneman (2012, p. 312).

10. See the so-called Ukraine Plan as leaked by *Novaya Gazeta* (Grozev, 2015).

11. Leader's welfare function: To keep things simple, we do not make the tax function explicit. As long as it is increasing and close to linear, it does not change the nature of the maximization problem. Not a steward: This perspective should not come as a major surprise. See Dawisha (2014). Recent analysis: Monaghan (2008).

12. For instance Alquist and Arbatli (2010, p. 5) concluded that "treating oil-futures prices as the expected future spot price is a good first approximation."

13. For the proof, see the Appendix.

14. Governor: On 11 December 2014, Russia's central bank expected "average oil prices to be $80 per barrel during the next three years. This average price results from consensus forecast of the leading analysts" (Nabiullina, 2014). Common practice: "It is commonplace in policy institutions, including many central banks and the International Monetary Fund (IMF), to use the price of NYMEX oil futures as a proxy for the market's expectation of the spot price of crude oil" (Alquist and Kilian, 2010, p. 541).

15. For instance, Kuznetsov (2014).

16. At face value: For instance, Gallucci (2014). Bond interest rates below Russian sovereign debt: Guriev (2014). Uncompensated expected loss: Implicit in this reasoning is the assumption that Rosneft has a higher probability of default than does Russia. One fact backing up this assumption is that Rosneft seeks help from Russia, and not the other way around.

17. Fearon (1995). There is no need to apply the more recent work of Powell (2006), who sees war as a commitment problem. In the case of Russia and Ukraine, many governments tried not only to broker peace but also announced stronger sanctions if negotiated deals are not honored. Thus they create commitment.

18. A conflict success function (e.g., Hirshleifer, 1995; Garfinkel and Skaperdas, 2007) specifies how military resources of one party translate into the probability of winning for that party. Details on this concept can be found in Anderton and Carter (2009, p. 246).

19. For the proof, see the Appendix.

20. And, again, the proof is in the Appendix.

21. *G* is the certainty-equivalent (CE) share of region *D* and defined in the Appendix. The certainty equivalent is the safe amount that is considered to be as attractive as the game itself. For a risk-acceptant player the CE is above the expected value of the game. For a risk-averse player it is below.

22. The need for a deeper understanding has been recently pointed out by Allison (2014, p. 1295): "The strategic and political consequences of a Russian readiness to rewrite borders in this way are most serious. This demands a concentrated effort to understand the extent to which Moscow seeks to challenge the current European international order and to better explain Russian actions towards Ukraine."

23. This statement could be proven formally by showing that expected utility increases with the variance. As this consequence of risk-acceptance is rather obvious, we do not detail the proof.

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Appendix

Proof of proposition 1

Start with sub-proposition (i). Risk-aversion means that the utility function is strictly concave. A full hedge reduces $xp+x(f-p)$ to xf, which is nonrandom. Due to assumption (2) this is equal to $xE[p]$. With the help of Jensen's inequality from probability theory one sees that getting the expected welfare for sure is the best outcome for a risk-averse leader because $E[u(xp)] < u(E[xp])$.

Sub-proposition (ii) implies a strictly convex utility function. The inequality reverses. Thus getting the expected welfare for sure is the worst thing for a risk-acceptant leader, which is why he will avoid hedging.

A risk-neutral decisionmaker maximizes $E[xp+h(f-p)]$. Insertion of (2) gives $E[xp+h(E[p]-p)]$. Since E is a linear operator, the term following the control variable h vanishes. What remains is $xE[p]$ for any choice of h. Hence, it does not matter.

q.e.d.

Proof of proposition 2

The proof is as in Fearon (1995) and given here for convenience of the reader. The left-hand side of the interval is trivial, because a Z bigger than A's expected value is clearly preferred by A over the alternative of going for war. The right-hand side follows from the same logic as seen by B.

$$(1-Z)D > (1-P)D-C_B$$
$$\Leftrightarrow -ZD > -PD-C_B$$
$$\Leftrightarrow ZD < PD+C_B$$

q.e.d.

Proof of proposition 3

Consider the case of A being risk-acceptant. This implies the following inequality:

$$E[u(YD-C_A)] > u(PD-C_A).$$

Denote the amount of the certainty-equivalent share of region D by G and define it implicitly via:

$$E[u(YD-C_A)] = u(GD-C_A).$$

As a consequence of u(•) being increasing, the certainty-equivalent of going to war is larger than the expected value. This increases the left-hand side of the interval and shrinks the set of the negotiable proportion.

q.e.d.

The evolution of concentration in the arms market

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Abstract

This paper examines the evolution of concentration in the global arms market, or industry, over the period 1990-2013 and considers its prospects. Using data from the Stockholm International Peace Research Institute (SIPRI) list of the largest 100 arms producing firms, it finds that within the international arms industry, there has been change but also continuity, particularly in the nature of the markets and the relations between the main producers and governments. While the changes that have taken place are important, it is still political rather than economic logic that shapes the evolution of the market. Certainly the arms industry remains relatively unconcentrated compared to other industries probably because of the domestic preferences in procurement by national governments. Countries do not like monopoly arms producers, but there is no western country other than the United States that can currently support more than one competitor, although in the near future Russia could and China may provide serious international competition to the U.S. What is clear is that there are economic forces pushing for increased competition, but the final outcome will be determined by political forces, and transparency and governance will become increasingly important issues.

This article examines the evolution of concentration in the global arms market, or industry, over the period 1990–2013. It uses data from the Stockholm International Peace Research Institute's (SIPRI) annual listing of the largest 100 arms producing firms. This list is a very valuable resource for analyzing the market, and researchers must be grateful for this asset. Although we use SIPRI's definition of the market, we recognize the difficulty of defining the arms market in terms of the usual criteria for defining an industry, or market, in terms of product, use, or geographical space. While the industry's products might appear quite heterogeneous (e.g., aircraft, tanks, or ships), they may be substitutable in use and Ministries of Defense (MoDs) need to determine the right mix of products for the appropriate application of force. However, their use is not unambiguous and purchase by MoDs is not a defining characteristic. MoDs also are major users of oil and petroleum products, which can account for a substantial part of their budgets, yet these are not normally regarded as part of the arms market, and similar comments apply to a variety of dual-use products. Additionally, MoDs purchase services from private companies, including private military companies, which are taking an increasing part of their defense budget as well. These companies now are being included in the SIPRI list.

For some products in some countries, the arms market is purely national, as the relevant MoD would not purchase from abroad, but even here there may be potential substitution. Even the United States, the most arms self-reliant country, purchases weapons on the global market. For other purposes, narrower definitions of the market may be useful, but here we use a wide definition. Inevitably, there are omissions. In particular, SIPRI does not include data on Chinese companies and the information on some other countries is limited.

There is a large literature on the arms industry. Dunne (2009) discusses the evolution of the concentration in the arms industry, which at the end of the cold war era was very low. Dunne (1995), Brauer (2007), and Hartley (2007) have general discussions of the industry. Reviews of the structure of the industry are given in Smith (1990; 2001; 2013). There are also studies of the industries in individual countries. Recent examples are Caruso and Locatelli (2013) on Italy and Mauro and Oudot (2014) on France. There are, however, considerable changes taking place in the industry, in terms of its structure, composition, and spatial characteristics, and so it is useful to have an updated analysis. This article provides this.

The next section considers arms industry dynamics, such as demand and supply side issues and the changes that occurred with the end of the cold war. This is followed by an analysis of the changes in concentration in the international arms industry since 1990, using Herfindahl–Hirschman indices. We then consider the size distribution of arms companies using power law representations. The final section presents some conclusions and considers the prospects for the industry.

Table 1: Top arms producing companies, 2012–2013 (sales in billions of USD; military sales share as percent of total sales)

Company	*2012*	*2013*	*Share (%)*
Lookheed Martin (US)	36.0	35.5	78
Boeing (US)	27.6	30.7	35
BAE Systems (UK)	26.8	26.8	94
Raytheon (US)	22.5	21.9	93
Northrop Grumman (US)	19.4	20.2	82
General Dynamics (US)	20.9	18.7	60
EADS (Airbus) (EU)	15.4	15.7	20
United Technologies (US)	13.5	11.9	19
Finmeccanica (IT)	12.5	10.6	50
Thales (FR)	8.9	10.4	55

Source: SIPRI.

Arms industry dynamics

Arms firms are often national champions who have a monopoly in arms production, giving the incumbent a clear advantage over outsiders considering market entry. Barriers to market entry, and exit, are important and the list of companies has been surprisingly stable. Despite the recent restructuring of defense prime contractors (the primes) and there being some mergers, the names of the top companies remain evident: Boeing, BAE, Northrop Grumman, and so, as shown in Table 1.

The evolution of the industry is driven by demand and supply forces. Demand depends on the size of the market, the level of military expenditure, itself a function of income (GDP) and perceived threats, the split of expenditure among new equipment, personnel, maintenance, and budget distribution over products and countries. On the supply side, a dialectical interaction exists between pressures for internationalization and pressures for nationalization to maintain domestic production. In production, large fixed costs, learning curves, and economies of scale make minimum efficient scales large and so provide incentives to internationalize. Yet states wish to maintain national technological autonomy and a defense industrial base to ensure security of supply for weapons. States also face tension between promoting competition to reduce prices in the face of the high fixed costs and economies of scale that promote monopoly. States are always actors in the arms industry as they buy arms, determine the quality/quantity mix of domestic

This article examines the evolution of the global arms industry, in particular in regard to firm concentration ratios. It is found that while the industry tends to follow the predicted power law distribution, for its size, the industry still lags behind civilian industry in terms of the expected degree of global concentration.

production, pay for R&D, license exports for strategic or other reasons, and often own defense firms, e.g., in France. A theoretical model of the determination of the defense industrial base and the size of the arms industry is provided in Dunne, *et al*. (2007).

On the demand side, military expenditure and arms exports peaked in the mid-1980s, then fell gradually at first, then more rapidly with the disintegration of the Soviet Union. Arms trade halved from the mid-1980s to the mid-1990s. The decline in military expenditure bottomed out in the late 1990s. Post-9/11, however, the Global War on Terror led by the United States resulted in military expenditure increasing again and reinforced the U.S. dominance of world military expenditure. At around the time of the 2008 global financial crisis, the U.S. accounted for 40 percent of the world total. Austerity measures in Europe and elsewhere, and the withdrawal from Afghanistan and Iraq, then reduced military expenditure, but growth in military expenditure emerged in other world regions, such as Asia and Russia.

The end of the cold war era produced not just a quantitative change in the amount of weaponry but a qualitative change in the type of weapons required. The Revolution in Military Affairs, which emphasized network-centric warfare and asymmetric conflict, changed the technology requirements of weapons systems and was associated with changes from technology spin-offs (to civilian markets) to spin-ins (from civilian markets). This recognized the advancement of civil technologies beyond military technology in many areas and led to the sourcing of major components and systems from civil companies, and company takeovers, to gain technological capabilities. In the United Kingdom, this is referred to as the use of civil-off-the-shelf technology.

The reduction in demand at the end of the cold war prompted a variety of corporate responses on the supply side, as reviewed in Smith and Smith (1992). Firms divested their military assets and converted or diversified to civilian activities, cooperated, merged, or took over competitors and internationalized. The financial system aided the mergers and acquisition process, and the U.S. government subsidized it. Although the primes might appear national champions, the supply chains were in fact international and even countries that appeared to import little, like the U.S., had many imported

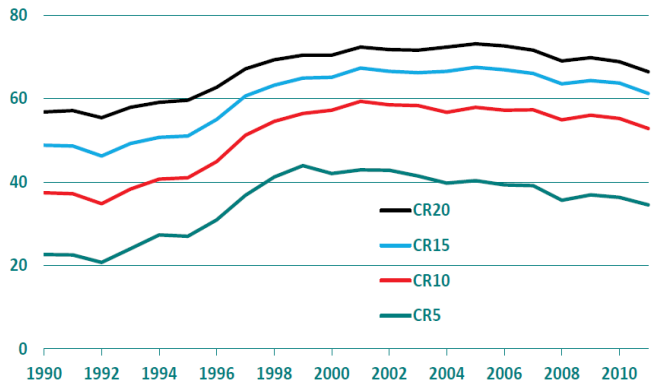

Figure 1: Arms industry concentration, 1990–2011 (market share as percentage of total market with *n*=100 firms). *Source*: Computed from SIPRI arms company database.

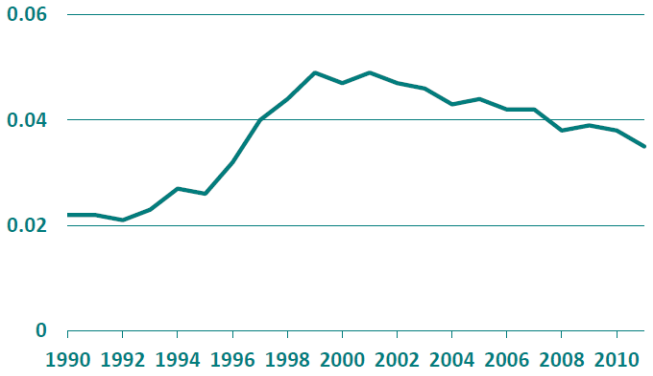

Figure 2: HHI scores (max=1.0) for arms sales and total sales of top-100 arms producing companies 1990-2011.

components in their systems. European restructuring was different, in part because of the involvement of domestic governments, but consolidation still happened to some degree. Increasingly, company restructuring has to be seen in conjunction with other states: allies, suppliers, collaborative production, and so on (Dunne, 2009).

Concentration

As noted, treating the international arms industry as an undifferentiated entity in itself is not without question. Defining the relevant market boundaries is difficult and the analysis here is restricted to data collected on the top-100 companies. Not only are there cross-country compositional concerns, but there are also problems on where the arms industry starts and ends. Different definitions and limits to data availability can lead to problems in aggregation and in composition. There is also a further composition effect in that the industry strongly depends on relative military expenditure, wherefore the demand side is dominated by U.S. spending.

A widely used measure of industry concentration is the Herfindahl–Hirschman Index (HHI). This is constructed by first ranking the top-100 companies by size, for example, as measured by arms sales A_i; i = 1, 2, ..., 100, and calculating each firm's share as

$$(1)\quad s_i = A_i / \sum_{i=1}^{100} A_i \,.$$

The N-firm concentration ratio is given by $\sum_1^N s_i$ and the Herfindahl–Hirschman Index, HHI, then is

$$(2)\quad HHI = \sum_1^{100} s_i^2 \,.$$

The U.S. Department of Justice, DoJ, regards an HHI of 0.15–0.25 as moderately concentrated and an HHI over 0.25 as highly concentrated. The inverse, 1/HHI, can be interpreted as the number of equivalent firms, so an HHI of 0.25 would be 4 equivalent firms. The HHI is sometimes calculated on the basis of percentage shares rather than proportionate shares.

Figure 1 presents the *share* of the top arms producers 1990–2011. The market share of the top-5 firms went up from 22 to a peak of 43 percent in 1999 and then declining to 35 percent by 2011. The top-20 share went from 58 to a high of 74 percent before declining to 68 percent. The other measures move broadly in line.

For the period 1990–2001, the concentration *index*, the HHI, more than doubled for arms sales, from 0.02 to 0.05, before declining again (Figure 2). In 2011, the HHI was similar to 1996, at 0.035, or about 28 equivalent firms. By DoJ criteria, this is a very low level of concentration, although for particular products, like fast jets, concentration would be higher.

SIPRI also gives data for *total* sales, rather than only *arms*-related sales, for the companies that it identifies as arms firms. The HHI for total sales is higher than for arms sales. This again shows that arms sales are less concentrated than civilian sales.

The pattern of restructuring identified in the previous section is clearly evident in the HHI-concentration numbers for the top-100 arms producers, in both arms sales and total sales. Concentration rose sharply following the end of the cold war when world military expenditure fell. Then concentration fell again when defense spending rose after 9/11. In the United States, a big increase in concentration occurred between the 1993 "Last Supper" event—when then-Deputy Secretary of Defense William Perry encouraged defense industry CEOs to merge their firms—and the 1997 block on a proposed Lockheed–Northrop merger.

To get some idea of the concentration of the industry,

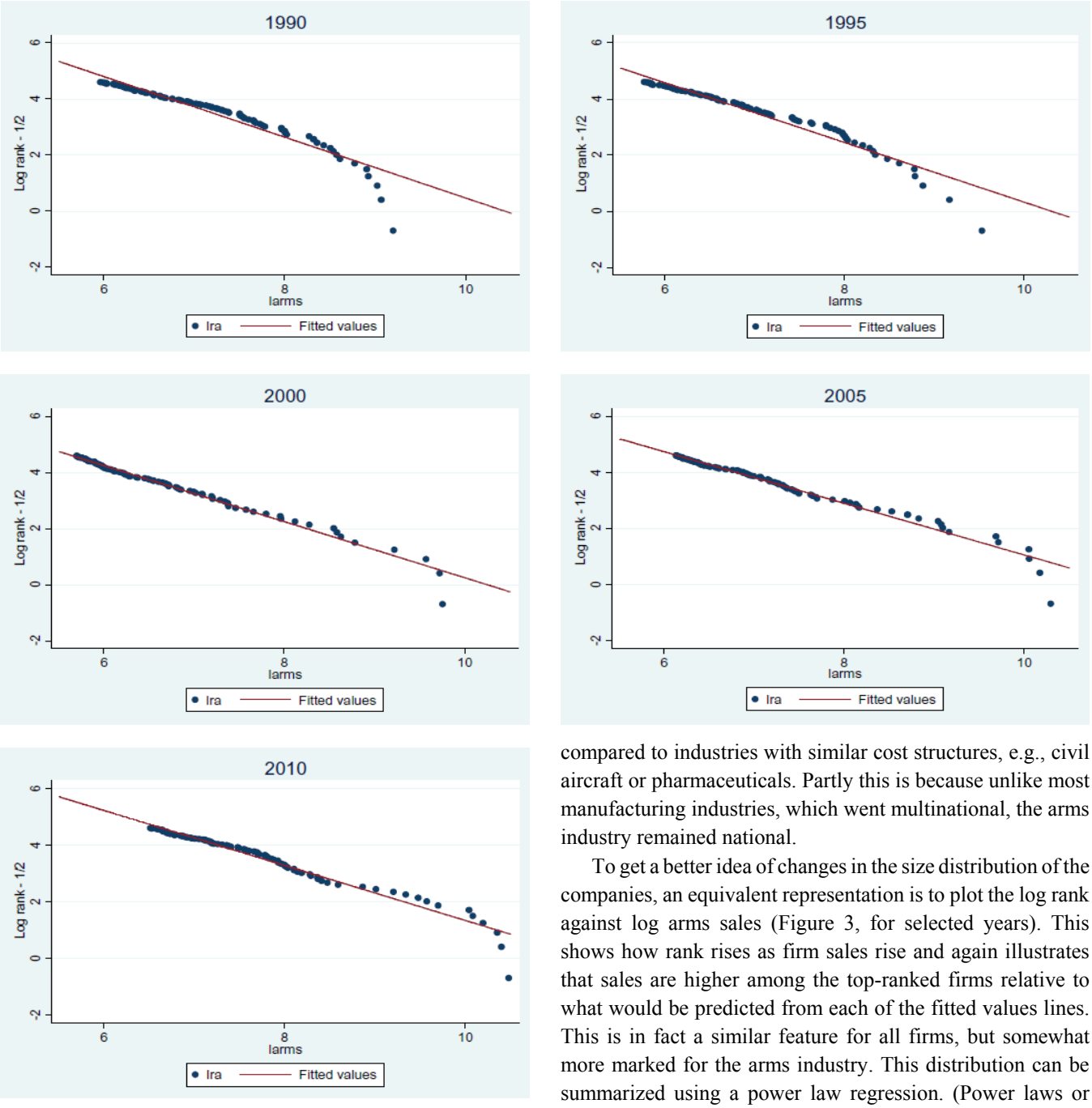

Figure 3: Arms industry power laws, selected years. *Source*: SIPRI arms company database.

Sutton (1991) provides a benchmark for industries consisting of submarkets. The arms industry is made up of many different types of submarkets such as for different types of weapons systems and for different countries. The Sutton lower bound of 20 percent for the share of the top-5 producers, C5, is only just below the 22 percent observed in 1990 for the arms industry. Thus, concentration in the this industry is not very high as compared to industries with similar cost structures, e.g., civil aircraft or pharmaceuticals. Partly this is because unlike most manufacturing industries, which went multinational, the arms industry remained national.

To get a better idea of changes in the size distribution of the companies, an equivalent representation is to plot the log rank against log arms sales (Figure 3, for selected years). This shows how rank rises as firm sales rise and again illustrates that sales are higher among the top-ranked firms relative to what would be predicted from each of the fitted values lines. This is in fact a similar feature for all firms, but somewhat more marked for the arms industry. This distribution can be summarized using a power law regression. (Power laws or Pareto distributions occur for many phenomena such as city size, business size, income, or wealth.) The relationship between firm rank (R) and size (S) can be written as

(3) $R = AS^b$.

A special case is Zipf's law, where b=|1|, coming from linguist Zipf's observation that the frequency of any word in a language is in proportion to its rank in the frequency table. The most frequently used word (rank 1) occurs twice as often as the

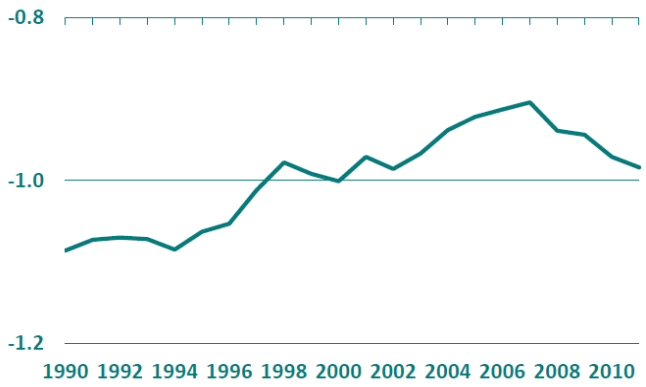

Figure 4: Evolution of the b coefficient.

second most frequently used word, and so on. This does seem to work well for the distribution of firm size as well, but there is a downward bias on estimation which has been dealt with by using the Gabaix and Ibragimov (2011) correction and estimating

$$(4)\quad \ln(R_i - ½) = a + b\ln S_i + u_i,$$

where S_i is arms sales of the firm ranked R_i.

If b=|1| then the distribution fits the Zipf distribution; if b>|1| there is a tendency for concentration to larger firms; and if b<|1| there is a tendency for concentration to smaller firms. This last result implies that size diminishes less than the quotient between the largest firm and the rank a firm occupies. In general, the size distribution of firms tends to follow the distribution with an exponent of about 1.06 (Gabaix, 2016).

A useful way of seeing the change over time is to consider the evolution of the b coefficient. Thus, Figure 4 shows a clear change in the coefficient value from above to below (absolute) one, with the transition taking place in the early 2000s. In the late 2000s, it declines again and is close to 1 by 2011. Looking at the distributions for selected years, 1990, 1995, 2000, 2005, and 2010, in Figure 3, one notices that the break-away from the fitted lines at the highest arms sales levels is relatively consistent over time and that while concentration changed, the pattern at the top ranks did not. (To get a sense of how the structure of the arms industry differs from industry in general one can refer to Luttmer, 2007, which considers how well cumulative employment in the U.S. is approximated by gamma and lognormal distributions. His work suggests that, except for the largest international arms-industry firms, a similar distribution applies.)

A clear pattern thus emerges, with the expected changes in arms industry concentration following rises and falls in demand in an industry with high fixed costs, but what happened was rather large. Concentration peaked in the early 2000s. Although it has declined since then, it is not back to the relatively low concentration level of the early-1990s. The fall in R&D was less than the decline in military spending, so fixed costs have risen for the industry.

Despite the increase in concentration that has occurred, the nature of market is such that it should be more concentrated and more multinational than it currently is. Even if one looks at narrow categories, military production tends to be much less concentrated than civilian production. For instance, there are more manufacturers of fast military jet aircraft than of large civil aircraft.

It is likely that national governments' policies such as the blocking of the 2012 proposal to merge BAE and EADS, have restrained the tendency to higher concentration that would have resulted from the operation of market forces. Market forces, however, are likely to maintain the pressure toward concentration.

Conclusion and prospects

Within the international arms industry, there has been change but also continuity, particularly in the nature of the markets and the relations between the main producers and governments. While the changes that have taken place are important, it is still political rather than economic logic that shapes the evolution of the market. After the end of the cold war, the industry restructured, and it continues to do so, but there are differences to the initial trends. Certainly the arms industry remains relatively unconcentrated as compared to other industries, probably because of the domestic procurement preferences exerted by national governments. With the decline in demand after the cold war came a continued increase in R&D intensity, representing fixed costs for the companies, and this led to increases in concentration. After the 9/11 attack on the United States, there was an increase in demand and a resulting reduction in concentration, but firm concentration is not yet back to the level of the 1990s.

The U.S. arms industry is still dominant, but this is not the whole story and there are important differences between the U.S. and Europe that need further investigation. While the U.S. restructuring continues, the EU has been slower and restructuring still has some way to go. With the limited demand in Europe, there should be more focused and concentrated production, with some regions producing major weapon systems and with the rest involved in niche and supply chain production, but this is a long way off. The U.S. dominance remains and U.S. and European links have developed, but there are also important new global players, China and Russia most noticeably, but also the other two BRIC countries, Brazil and

India. The industry has certainly internationalized, particularly in its supply chains.

While the primes still maintain dominance, a lot of new companies are entering the market. Some are being taken over by the primes to expand their capabilities and this may increase in the future. It is also noticeable that industrial sectors different from the "traditional" arms sectors are becoming increasingly involved as a result of changing technologies and outsourcing of military and related services by defense ministries. One implication is that parts of the military-industrial complex now have an active interest in conflict, rather than just in the production of arms (Dunne and Sköns, 2010).

What are the industry's prospects? There are still too many large companies, so there is continuing pressure to merge. But in 2012 the proposed EADS-BAE merger was stopped by the German government and so Europe has seen rather limited concentration. The U.S. has Lockheed, Northrop-Grumman, and Boeing competing, with Airbus and BAE Systems in the wings. Countries do not like monopoly arms producers, of course, but other than the U.S. there is no western country that can currently support more than one competitor. It is questionable whether domestic competition is still viable, even in the U.S. In the near future, Russia could, and China may, provide serious international competition to the United States.

One area where concentration would seem particularly likely is military aircraft production, where there are an unsustainably large number of companies, especially in Europe. If defense budgets become even more constrained, pressure to increase concentration will ramp up, but it is not clear that industry concentration will increase as it did in the 1990s, and it is an open question as to what the process of restructuring will be. The follow-on imperative operates to limit competition, and different national defense industrial bases have different styles, making international cooperation and restructuring difficult. What is clear is that there are economic forces pushing for increased competition, but the final outcome will be determined by political forces, and transparency and governance will become increasingly important issues.

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The role of military expenditure and arms imports in the Greek debt crisis

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Abstract

Despite the vast amount of empirical work performed on the defense–growth relationship, the impact of military expenditure on public debt is a largely neglected topic. The recent Greek debt crisis brought to the forefront the role of military expenditure as well as the inefficiencies and the inability of the EU to deal with the European debt crisis. This article investigates the role of military expenditure (among other factors) in the evolution of the Greek debt over the period 1970-2011. Greece is a particularly interesting case in this regard, given its high military burden since 1974 and the recent debt crisis that led the country to sign a bail-out package presented by the European Union, the European Central Bank, and the International Monetary Fund, which involves extreme austerity measures and cuts in public spending. Employing the ARDL approach to cointegration, this article concludes that military expenditure and arms imports have had an adverse (i.e., increasing) effect on Greek public debt in the short-run, while investment has helped to reduce debt both in the short- and the long-run.

The Greek debt crisis started in 2009, soon to be transmitted to the rest of Europe: Mediterranean EU countries—Italy, Spain, and Portugal (known, along with Greece, as the peripheral EU countries)—were most profoundly affected. Greece first signed a bail-out package presented by the EU, the ECB, and the IMF (the "Troika") in 2010. It involved the adoption of severe austerity measures (spending cuts and increases in taxation) as well as the implementation of structural reforms. Despite the severity of the measures, years later, Greece still found itself in a very difficult economic situation, with public debt at around 175 percent of GDP in 2014 and suffering from a deep, continuous recession. According to the World Bank, between 2008 to 2014, real GDP declined by 25.7 percent, from USD269 billion to USD200 billion, while unemployment increased from 9 to 27 percent. The austerity measures imposed on Greece by the EU, the ECB, and the IMF also triggered debates among academics, journalists, and the general public regarding the role and sustainability both of the EU and the eurozone.

A topic often neglected in identifying the underlying reasons for high Greek public debt is its military expenditure. Greece stands out in comparison to other EU countries in terms of both high public debt and high military burden. The country's military burden has been well above the EU and NATO averages since 1974, the year that saw the collapse of Greece's military government and Turkey's invasion of Cyprus.[1] The main justification for continuous high military expenditure has been the perceived threat from Turkey. Despite Greek efforts to develop a domestic defense industry since the mid-1970s, the industry remains underdeveloped and the country largely relies on arms imports. In 2009, at the beginning of the debt crisis, Greece was the world's fifth biggest arms importer (after India, Malaysia, Singapore, and China), with most of the imports coming from the United States, Germany, and France. Undoubtedly, the French and German arms industries gained a lot from Greece's excessive spending. In the five years up to 2010, Greece purchased more of Germany's arms exports than any other country, and most of these purchases involved great scandals and corruption among Greek politicians and German companies. Since 2010, military expenditure cuts for Greece (and also for Italy and Spain) were among the largest in Western Europe.[2]

This article argues that, among other factors, military expenditure contributed to the build-up of Greece's public debt. It also criticizes the EU as, since 1981, when Greece became a member of the European Community, the country was indirectly compelled to import military equipment from EU countries in order to deal with the perceived Turkish threat. In addition, joining the EU made Greece more reliant on imports and the country cut home production since then. The two main objectives of the article are to assess the fundamental problems of the country, along with the role of the EU, and to provide some empirical evidence regarding the role of military expenditure in Greek public debt by employing the ARDL approach to cointegration over the period 1970-2011.

The next section briefly reviews the limited literature on the military expenditure –public debt nexus. An overview of the Greek economy follows, focusing on the evolution of Greek public debt and military expenditure as well as on the country's main security considerations. A further section presents the

data, model, and findings. The last section concludes the article and provides some policy-related recommendations.

Literature review

Many studies investigate the economic effects of military expenditure or the economic effects of public debt but only a few look at the impact of military expenditure on public debt. Greece stands out in comparison to other EU countries in terms of both high debt and high military burden. Despite this, the role of military expenditure in understanding the indebtedness of the Greek state has received little attention.

Greece has been a big importer of military equipment since the mid-1970s. Imports of sophisticated weapons and other military equipment can be financed at the cost of investment and/or of human capital formation, or at the cost of increased foreign debt. Military expenditure is financed by taxation but when tax revenues are not enough, as in the Greek case, the country runs a budget deficit. Ordinarily, this can be covered by printing money—but not in this case as Greek monetary policy is in the hands of the ECB—or by using foreign exchange reserves, if available, or by borrowing domestically or internationally. But borrowing to finance arms imports has cumulative effects on debt through interest payments.[3]

Studies on military expenditure as a determinant of public debt in developing countries were first published in the early to mid-1980s. The findings suggest that military expenditure increases foreign debt and leads to reduced growth and also that military expenditure is import-intensive and increases public debt. Since then, additional studies that focus on developing countries have come to broadly similar conclusions. Exceptions notwithstanding, studies which focus on more advanced economies likewise have found an increasing effect of military expenditure on public debt growth.[4]

Although the literature on the determinants of public debt does not provide clear guidance regarding possible explanatory variables, typically, apart from military expenditure (or even better, arms imports, if data are available), most studies consider real GDP or real GDP per capita as a proxy for a country's capacity to borrow internationally: Higher output implies a higher debt ceiling as well as higher collateral for the borrower. If richer countries have greater capacity to repay debt, they nonetheless might borrow less, leading to a negative relation of GDP to debt. Yet, it is equally plausible that higher GDP encourages governments to spend more, for example on defense, in which case a positive effect on debt is expected.[5]

Greece: Economy and security

The pre-EU period

With a population of just below 11 million people, Greece is a small country. Located in the southern Balkans at an important geostrategic point between the East and the West, it was until the late 1950s an underdeveloped country characterized by low-productivity agriculture and a very weak industrial sector. This situation was partly attributable to Greece's civil war (1944–1949), which became an important element in the cold war as it was believed that the Soviet Union was supporting Greek communists. Meanwhile, the United States and the Greek army had become important forces in Greek politics, and Greece became tied to Western organizations such as the Organization for European Economic Co-operation (OEEC), the Council of Europe and, in 1952, NATO. During the post-1949 period, Greece's primary security concerns related to Warsaw Pact countries and to Turkey. By joining NATO, Greece secured its northern borders but not its eastern flank since the strategic interaction between Greece and Turkey has two contradictory facets: NATO allies, yet state to state adversaries.[6]

This article argues that military expenditure (among other factors) contributed to the build-up of Greece's public debt. It also criticizes the EU as, since 1981, when Greece became a member of the European Community, the country was indirectly compelled to import military equipment from EU countries in order to deal with the perceived Turkish threat.

After 1955, Greece's relations with the United States and the United Kingdom became troubled, partly because of resentment over U.S. influence in Greece but also because of the Cyprus problem. Cyprus was a British colony with a population that was 80 percent Greek and 20 percent Turkish. The Greek population wanted self-determination and *enosis* (union) with Greece. Naturally, the Athens government felt sympathy for Greek-Cypriots, thus provoking tensions with its NATO allies Britain and Turkey. In 1959, Cyprus gained independence from Britain, without *enosis*. Greek-Turkish tensions were renewed in 1964, and at that time UN forces were sent to the island.[7]

In the 1960s, Greece's economic structure experienced important qualitative changes. For the first time, in 1962, the contribution of the industrial sector to national output exceeded that of agriculture. During 1961–1970, Greece allocated an annual average of 4.3 percent of GDP to defense and saw an annual average GDP growth rate of 7.6 percent—well above the European average. The annual average rate of inflation was low at 3.1 percent. On 21 April 1967, a group of army colonels seized power in Athens. The military government that resulted remained in power for seven years (1967–1974), collapsing immediately after the Turkish invasion of Cyprus in 1974 which followed the Athens- instigated coup against the elected

Table 1: Greek economic indicators

	1971–1980	*1981–1990*	*1991–2000*	*2001–2010*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*
GDP growth (%)	4.70	0.71	2.48	1.80	–0.34	–4.30	–5.48	–9.13	–7.30	–3.20	0.65
Investment growth (%)	4.02	–0.59	4.34	0.58	–7.19	–13.93	–19.35	–20.50	–23.46	–9.36	–2.79
Investment (% of GDP)	30.21	24.57	22.26	23.07	23.81	20.79	17.56	15.27	12.62	12.02	11.61
Inflation (%)	14.50	19.0	9.40	3.30	4.15	1.21	4.71	3.33	1.51	–0.92	–1.31
Public debt (% of GDP)	20.70	49.8	97.40	110.6	112.9	129.7	148.3	170.9	156.5	174.9	177.2
Milex (% of GDP)	4.93	4.62	3.48	2.97	3.10	3.32	2.78	2.46	2.38	2.49	2.20

Note: GDP and investment growth rates are calculated from constant 2005 USD. *Sources*: World Bank and SIPRI online data.

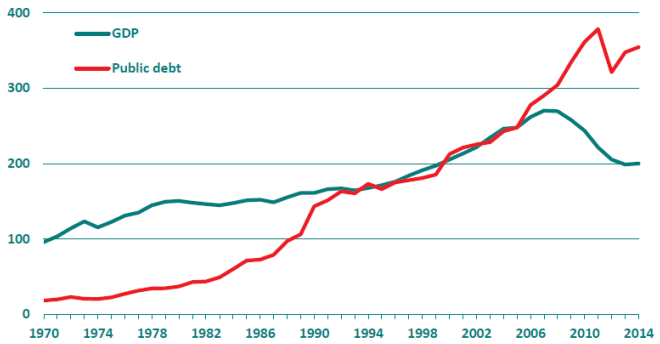

Figure 1: Greek real GDP and real public debt (in constant 2005 USD). *Sources*: See Table 1.

president of the Cypriot Republic.[8]

In these circumstances, the impressive growth rates of previous decades started to decline in the 1970s as structural weaknesses of the Greek economy became apparent. Yet even though the annual average GDP growth rate fell to 4.7 percent (in comparison to 7.6 percent in the previous decade), it was still well above the average of the then-European Community countries. Greece's military burden increased to just below 5 percent of GDP, and price inflation went up to 14.5 percent. Investment as a share of GDP was at around 30 percent (see Table 1).[9] In the early 1970s, government-controlled defense industries were established, both because of weapons embargoes imposed during the seven year reign of the military government but also because Greece wanted independence in weapons procurement due to the increasing tensions with Turkey. By the mid-1970s, the internal communist threat had disappeared yielding its place to the more traditional animosity with Turkey. In 1974, the Turkish invasion of Cyprus and the establishment of democracy in Greece marked a huge increase in military expenditure, and the threat of an outbreak of open confrontation with Turkey was considered high.[10]

Thus, 1974 was a very important year for Greek politics: It brought the collapse of the military dictatorship and coincided with the Turkish invasion of Cyprus. Since then, Greece has had Europe's and NATO's highest military burden, the underlying reason (or justification) being the perceived threat from Turkey. Furthermore, for many years after 1974 it was widely believed that there was an arms race between Greece and Turkey. This, however, is not backed up by empirical evidence. Most studies have rejected the existence of an arms race and have instead confirmed that the main determinant of Greek military expenditure is the Turkish threat.[11]

The post-EU period

In the 1980s, the Greek economy deteriorated. The average annual GDP growth rate was only 0.71 percent (the rest of Europe's was 2.3 percent), while inflation increased to an average of around 19 percent annually. Investment as a share of GDP declined, reaching an average of 24.5 percent of GDP for the decade. Despite the economic problems, military expenditure was kept at high levels: During the 1980s Greece allocated an annual average of 4.6 percent of GDP to defense. In 1981, Greece became a full member of the European Community (EC) and, since then, its debt started to increase

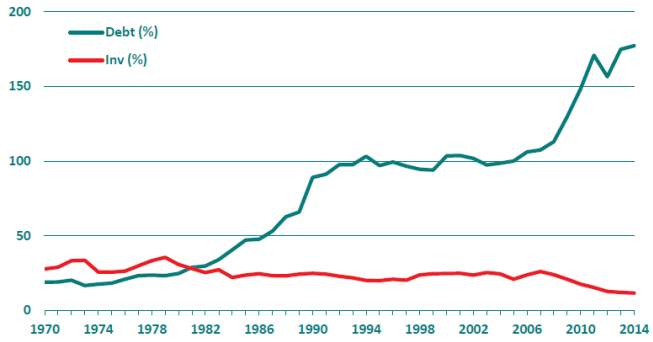

Figure 2: Greek public debt and investment as percent share of GDP. *Sources*: See Table 1.

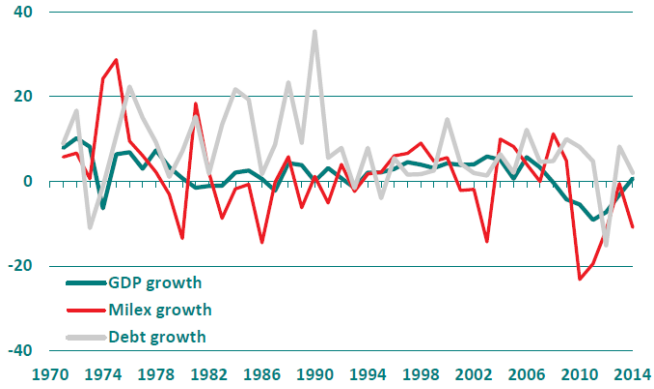

Figure 3: Annual Greek GDP, military expenditure (milex), and public debt growth (percent). *Sources*: See Table 1.

mainly due to the payment of high interest rates on previous debt as well as due to the country's inability to collect tax revenues, the expense involved in the state recapitalization of private banks, and excessive and unjustifiably high military expenditure. Prior to 1981, public debt was only 21 percent of GDP (see Table 1 and Figure 2) and Greece would borrow externally in order to finance investments. However, from 1981 onward, external borrowing was used to boost consumption and to increase the standard of living. By the end of the 1980s, public debt had reached 80 percent of GDP (Figure 2). Since the early 1980s, Greece had become a significant market for advanced weapons systems and this led to foreign trade deficits, shortages of foreign currency, and devaluation of the currency against the U.S. dollar. In 1985, Greece declared a defense doctrine that officially marked Turkey as the principal threat to its security.[12]

During the 1990s, deep concerns arose over the Balkan civil wars. Greeks were particularly upset by the creation of a state called Macedonia (as Macedonia is the name of the northern part of Greece). Also, there was some concern over the treatment of the Greek minority in Albania. Initially, these events seemed to signal additional security concerns for Greece but since none of these countries possessed large military establishments, Greek defense policy and military planning were not affected. Economic indicators improved slightly during the 1990s mainly because of Greece's effort to achieve the required criteria for joining the European Monetary Union. For this period (the 1990s), GDP growth increased to 2.5 percent while military burden fell to 3.5 percent because of the tight fiscal and macroeconomic policies put in place. Inflation was brought down to an annual average of 9.4 percent for the same period while investment as a share of GDP lay just above 22 percent. Despite these improvements, Greece's economy remained weak and performed well below the EU's average. Public debt as a share of GDP increased further, averaging just above 97 percent of GDP for the 1990s.

In 2001, when Greece joined the eurozone, the inflation rate was reduced further (averaging 3.3 percent for the decade) while over the period 2001–2008, low interest rates and increased borrowing led to increased investment (an average of 24 percent of GDP for these years) and high growth rates (3.5 percent, on average). Yet, low-cost borrowing in conjunction with low production encouraged excessive spending and private credit growth. Borrowing is not a bad thing if funds are used for productive investment and infrastructure. But this was not the case for Greece. After the collapse of the military government in 1974, all democratic parties in power secured votes by expanding the public sector. The huge, inefficient, and very well-paid public sector, the political connections required to find a job in the public sector (even without skills), the high pensions, and the generous retirement packages for public servants along with tax evasion, corruption, and bribes among politicians, civil servants, and tax officials (well described by the Greek words *fakelaki* and *rousfeti*) were (and probably still are) the fundamental problems of the Greek state. On top of this, dozens of closed professions (pharmacists, truck and bus owners, etc.) as well as labor union power have contributed to the lack of competitiveness in Greece.[13]

The post-global financial crisis period

In the wake of the burst of the global financial crisis, in 2008, European banks exposed to subprime-based mortgage-backed securities experienced losses, and the European Commission approved 4.5 trillion euros in aid for banks. For the euro periphery, the crisis triggered a major reassessment among investors of the sustainability of rapid credit growth and large external deficits. According to one author, it was the combined impact of domestic recessions, banking-sector distress, and the decline in risk appetite among international investors that led

Table 2: A brief chronology of key events for Greece in the post-EU era

Jan. 1981	Greece joins the EC (later renamed EU).
2001	Greece joins the Eurozone. Was Greece ready to join?
2007–2008	Global Financial Crisis.
18 Oct. 2009	Greek Prime Minister, George Papandreou, admits budget deficit is double the previous government's estimate and will reach 12.7 percent of GDP.
23 Apr. 2010	George Papandreou formally requests an international bail-out for Greece. The EU, ECB, and IMF agree to participate. 1st bail-out package: € 110 billion.
Feb. 2012	2nd bail-out package: € 130 billion.
Mar. 2012	Private sector involvement— debt "haircut" (€ 107 billion).
5 Jul. 2015	Referendum: "Yes" or "No" to austerity measures and then the 3rd bail-out package of € 86 billion.

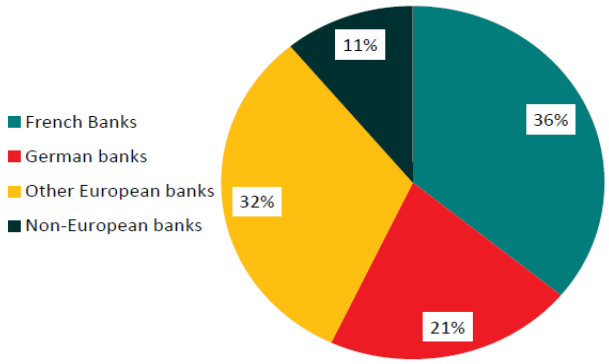

Figure 4(a): Holders of Greek public debt (end of 2009).

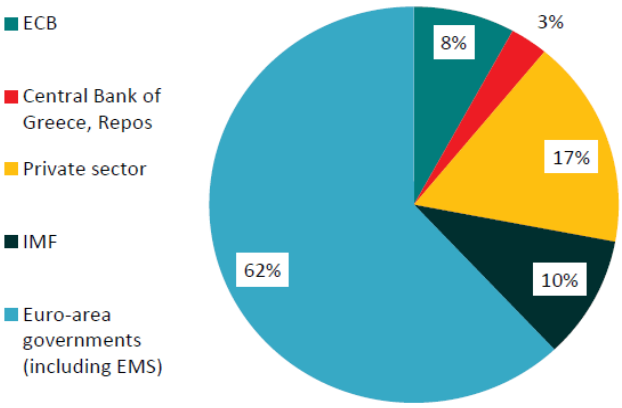

Figure 4(b): Holders of Greek public debt (end of 2014). *Sources*: Bloomberg; Greek Finance Ministry; European Commission.

to the European sovereign debt crisis. For Greece, this stressful situation was accompanied by the announcement, in October 2009, of a revised budget deficit of 12.7 percent of GDP (instead of 6 percent). Risk-spreads went sky-high, and no longer could Greece borrow on the international financial markets as rating agencies kept downgrading Greek bond issues. Six months later, Greece officially requested a bail-out. Table 2 summarizes the key events from 1981, when Greece joined the EU, up until July 2015.[14]

The bail-out loans were accompanied by austerity measures imposed by the EU, the ECB, and the IMF. They included wage and pension cuts, fiscal reforms (raising taxes, cutting government spending, and tax system improvements to increase tax revenues and fight tax evasion), and various structural reforms such as opening up closed professions, reforming pension funds to make them viable in the future, lengthening the retirement eligibility age for women, making the labor market more flexible, privatizing public corporations and assets, and reducing state bureaucracy.

But was it really *Greece* that was bailed out at that point? I would argue that this was not the case. Instead, the aim of the initial bail-out was to offer a safe exit to private bondholders exposed to Greek bonds. One can easily confirm that by seeing where the monies went: Only 27 billion euros (11 percent of the total funding) were used for the Greek state's operating needs. The rest went to the country's banks and to foreign creditors, mostly French and German banks. Most of the bail-out funds were used to bail out, directly or indirectly, the financial sector (both Greek and foreign)—not Greece. The overwhelming part of Greek government debt was shifted from the private to the public sector, with other eurozone governments now liable for around 65 percent of Greece's debt (and another 20 percent in the hands of the ECB and IMF). These facts can easily be observed by comparing holders of Greek debt before and after the bail-out (Figure 4).[15]

The current situation

Between 2008 and 2014, Greece experienced years of deep recession, with real GDP down by nearly 26 percent, the overall unemployment rate climbing to 27 percent, and youth unemployment reaching an astounding 60 percent. Pensioners, the unemployed, and the poor are suffering (30 percent living below the poverty line, 17 percent unable to meet their daily

Table 3: ARDL results, 1970–2011

Panel (a): ARDL(1,0,0,0) with military expenditure

Estimated long-run coefficients
LDEBT = –34.88 + 5.10 LGDP + 2.81 LMILEX –3.73 LINV
(5.29) (4.36) (1.43) (3.07)

Error correction representation
dlDEBT = –2.88 + 0.42dlGDP + 0.23dlMILEX
(2.13) (1.72) (2.58)
– 0.31dlINV – 0.08ECM
(3.22) (2.11)

R-squared = 0.41

Diagnostic tests
Serial correlation: X2(1)=0.03; F(1,33)=0.03
Functional form: X2(1)=1.32; F(1,33)=1.16
Heteroskedasticity: X2(1)=0.19; F(1,37)=0.19

Panel (b): ARDL(1,0,3,1) with arms imports

Estimated long-run coefficients
LDE = –29.25 + 6.25 LGDP – 0.12 LARMS – 2.92 LINV
(7.59) (12.87) (0.89) (6.98)

Error correction representation
dlDEBT = –4.58 + + 0.98dlGDP + 0.02dlARM + 0.03dlARM1
(2.98) (3.92) (1.80) (2.18)
+ 0.05dlARM2 – 0.22dlINV – 0.16ECM
(4.48) (2.19) (4.11)

R-squared = 0.63

Diagnostic tests
Serial correlation: X2(1)=1.73; F(1,28)=1.34
Functional form: X2(1)=0.57; F(1,28)=0.42
Heteroskedasticity: X2(1)=0.06; F(1,36)=0.06

food needs, and 3.1 million people without health insurance). Surviving businesses are tired of uncertainty. People who still have a job face lower wages and higher taxation. Between 2010 and 2012, the suicide rate rose by 35 percent. Furthermore, Greece has suffered a severe brain drain: More than 120,000 professionals—including doctors, engineers, and scientists—have left Greece since the start of the crisis. These effects are, ironically, worse than any open warfare with Turkey might have been!

On top of this, the conflict with Turkey remains unsolved as disagreements over Cyprus, the extent of the continental self of the Aegean Sea, and the control of the airspace above it, persist. These security considerations, and the absence of EU support for an EU border country, compelled Greece to be a big defense spender and increase its public debt even as arms exporting countries, in particular France, Germany, and the U.S., received substantial benefits from this constellation of forces for a good many years.[16]

Model, data, and findings

Following other authors, apart from income and military expenditure (or, alternatively, arms imports), investment is included in the model that is estimated by the ARDL approach to cointegration. The model is given by

(1) $DEBT = f(DEBT_{-1}, GDP, INV, MILEX \text{ [or ARMS]})$,

where DEBT is public debt; INV is gross fixed capital formation; MILEX is military expenditure; and ARMS is arms imports, all in real terms. $DEBT_{-1}$ is DEBT lagged by one time period.[17]

Data on debt, GDP, and investment come from the World Bank online database and data on military expenditure and arms imports from SIPRI, all for 1970–2011. All variables are in constant 2000 USD and transformed to their logarithmic forms. The model is first estimated using military expenditure, then using arms import data. The expectation is that either variable has a greater than zero effect on public debt, at least in the short-run. Regarding the GDP variable, the expected effect could either be negative (on the argument that higher GDP eases debt repayment) or positive (on the argument that higher GDP encourages governments to spend more on arms). Finally, investment is expected to lower public debt through the creation of jobs and the increase in international investors' and creditors' confidence (and hence result in lower interest rates).

Determining the order of integration of the variables is not necessary for the ARDL approach to cointegration as both I(0) and I(1) variables can be used. However, to confirm that the series are not I(2), all variables are tested for unit roots using the augmented Dickey Fuller, or ADF, test. The unit root tests suggest that all variables are integrated of order 1.[18] The ARDL bounds approach is used to identify and examine the long-run relationship between DEBT and the explanatory variables.

The ARDL method has a number of advantages over other cointegration methods. A key advantage is that it can be applied regardless of whether the regressors are I(0) or I(1). While other cointegration techniques are sensitive to sample size, the ARDL approach is suitable even if the sample size is small. Moreover, it permits one the use of a number of lags to capture the data-generating process with a general-to-specific methodology. Also, the approach allows one to derive a dynamic error correction model (ECM) that integrates short-run dynamics with the long-run equilibrium without losing long-run information. Lastly, the ARDL approach generally provides unbiased estimates of the long-run model,

even when some of the regressors are endogenous.[19]

Table 3, Panel (a) shows the long-run estimates and the error correction representation of the ARDL with the military expenditure variable. Panel (b) shows the results when the arms import variable is used. In both cases, the lag selection of the ARDL is based on the Schwarz Bayesian criterion. To sum up the empirical evidence in Table 3: The findings support the notion of a greater than zero effect of military expenditure (or arms imports) on Greek public debt only in the short-run. Higher income (GDP) has an increasing effect on debt as well, but in both the short- and the long-run. So, for Greece, the argument that higher income increases the capacity to borrow and results in more military expenditure applies. This accords with studies for developing and emerging markets but is in contrast to most other studies, which find a negative effect of income on public debt. Further, both models provide strong evidence that investment reduces public debt, both in the short- and the long-run. Taken together, these findings suggest that a reduction in public debt can come about with higher investment and lower military expenditure (or arms imports).[20]

Conclusion

This article has provided an overview of the Greek debt crisis, paying special attention to the role of military expenditure and arms imports as well as to the role of the EU. Lying at the crossroad between Orient and Occident, Greece encountered fundamental problems after the end of its civil war, and the turmoils following it, that its period of military dictatorship (until 1974) never managed to deal with. All Greek political parties after 1974 are to be blamed for creating an augmented, highly paid, and inefficient public sector in order to secure votes. Greek debt started growing in the early 1980s when it joined the EU (in 1981). Initially, the increase in public debt was due mainly to high interest payments on previous debt as well as to the inability of the state to collect taxes while, at the same time, a key concern was the expansion of the public sector. Yet one should not ignore the role of the EU itself, and clearly, some blame for Greece's problems lies with the EU.

Empirical evidence on the determinants of public debt for Greece supports the notion of a public debt-increasing effect of military expenditure (or arms imports) only in the short-run. Income appears to have such an effect both in the short-run and the long-run, a finding which supports the hypothesis that higher income increases the capacity to borrow (and lower income reduces it). This is not a surprising finding for Greece given its irresponsible governments over the last 40 years. On the other hand, the results clearly suggest that investment reduces public debt, both in the short- and long-run (when either the military expenditure or the arms imports variable is used).

These findings carry important policy implications as Greece struggles to reduce its public debt. Although military expenditure in general, and arms imports specifically, have been dramatically reduced in the post-crisis years, there has been no increase in investment. This is not surprising given international investors' lack of confidence in a country chaffing under a cruel austerity program and tight deadlines imposed by the EU, the ECB, and the IMF—not to mention the political instability following the election of a radical left wing-oriented government in 2015. On top of these concerns, the still-huge bureaucracy continues to be a key obstacle for entrepreneurs and investors.

Extending the current policies will only prolong the stagnation or even deepen the recession of the Greek economy. According to a report by Oxfam: "Extreme austerity that reduces deficits but not debts is destructive and does not create opportunities for the future." From a purely economic standpoint, there is little doubt that the Greek debt is unsustainable and debt relief should be considered. But debt is not a purely economic issue. It is mainly a political issue, and morality and culture play an important role as well. Since 1981, when Greece joined the EU, the strong EU members have been watching Greece's excessive military spending without any worries as they had huge benefits from arms exports. This is particularly the case for Germany and France which even after the start of the debt crisis refused to cancel arms deals with Greece. Had the EU guaranteed Greek borders with Turkey, Greece would not be spending excessive amounts on armaments, its military burden would be close to the EU average, and it could spend the amounts dedicated to defense to other, more growth-promoting sectors. The EU should finally accept the need to mitigate Greece's security concerns given the country's geostrategic position, serving, as it does, as an entry point to the EU. The recent refugee crisis makes clear that the EU now does have its own vested interests to assist Greece.[21]

Notes

For helpful comments I thank Jurgen Brauer and the participants of the 19th Annual International Conference on Economics and Security, 25-27 June 2015, Grenoble, France.

1. Nikolaidou (2008).

2. Fifth biggest importer: SIPRI online arms transfer database. Corruption: Smith (2012). Greece's excessive spending: Haydon (2012).

3. Brzoska (1994).

4. Early studies: See Brzoska (1983); Looney and Frederiksen (1986). Since then: Recent studies include Wolde-Rufael (2009); Forslund, Lima, and Panizza (2011); Georgantopoulos and Tsanis (2011); Shahbaz, Shabbir, and Butt (2011); Zaman, *et al*. (2012); Anfofum, Andow, and Mohammed (2014); Muhauji and Ojah (2014). More advanced countries: Alami (2002) for the Arab region; Dunne, Perlo-Freeman, and Soydan (2004a) for 11 industrialized countries; Kollias, Manolas, and Paleologou (2004) for Greece; Gunluk-Senesen (2004) for Turkey; Smyth and Narayan (2009) for six Middle Eastern countries. Exception: Sezgin's (2004) study on Turkey found a negative effect of military expenditure on debt but this changed to a positive effect when arms imports were considered instead of military expenditure.

5. Capacity to borrow internationally: E.g., Looney (1989); Dunne, Perlo-Freeman, and Soydan (2004). Higher output implies: Smyth and Narayan (2009).

6. Contradictory facets: Sezer (1984).

7. Troubled relations: Veremis (1982).

8. Contribution of industry and agriculture: Kollias (1996).

9. Table 1, which runs through 2014, is in constant 2005 USD. Later on in this article, reference is made to a model estimated in constant 2000 USD, using data through 2011.

10. Traditional animosity: Avramides (1997).

11. Have rejected: Nikolaidou (2008). See Brauer (2002) for a comprehensive review of the literature of the time.

12. From 1981 onward: Kouretas and Vamis (2010).

13. Fundamental problems: See Michelis (2011) for a detailed discussion of the fundamental Greek problems. *Fakelaki* refers to a small envelope with money that Greeks visiting public service offices or public hospitals give to the attending public officer under the table to get "job done quickly," to receive preferential treatment, or to ask for favors. In return for a promise to vote for them, *rousfeti* refers to voters going to politicians' offices to ask for a favor (typically to give their sons/daughters/relatives/themselves a job in the public sector).

14. European Commission approved: European Commission (2012). One author: Lane (2012).

15. Where the monies went: See Mouzakis (2015). Overwhelming majority: Singh (2015).

16. Suicide rate: Rachiotis, *et al*. (2015). Brain drain: Lambrianidis and Vogiatzis (2013). Conflict with Turkey: For a comprehensive review of Greek-Turkish relations, see Constas (1991). From the Greek perspective, Turkey is characterized by imperialism and aims to change the status quo established by the treaties of Lausanne (1923), Montreux (1936), and Paris (1947). The 1974 Turkish invasion of Cyprus and the presently continuing occupation of 40 percent of the island by Turkish troops is viewed as proof of Turkey's ambitions and strategic aims.

17. Following other authors: Shahbaz, Shabbir, and Butt (2011) and Anfofum, Andow, and Mohammed (2014).

18. To save space, unit root results are not provided but are available upon request from the author.

19. The ARDL bounds approach: As advanced by Pesaran and Smith (1998), Pesaran and Shin (1999), and Pesaran, Shin, and Smith (2001). ARDL advantages: Engle and Granger (1987); Johansen (1991, 1995); Johansen and Juselius (1990). ARDL suitable even with small sample size: Odhiambo (2010). Dynamic ECM: Shrestha and Chowdhury (2005. Unbiased estimates: Harris and Sollis (2003).

20. Accords with other studies: For instance, Anfofum, Andow, and Mohammed (2014); Forslund, Lima, and Panizza (2011).

21. Oxfam: Oxfam (2011). From a purely economic standpoint: Nikiforos, Papadimitriou, and Zezza (2015).

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Military expenditure in Greece: Security challenges and economic constraints

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Abstract

Against the backdrop of significant political, economic, and security-related changes that have taken place over the past two decades or so, this article examines the factors that affect military expenditure in Greece. Invariably ranked among the countries with the highest defense burden in the EU and NATO, it would appear that such budgetary outlays have mostly been driven by the ability of the economy to allocate scarce resources to national defense and less so by external security considerations.

One of the state dyads that have attracted considerable attention in the defense and peace economics literature, is Greece and Turkey. Both have invariably ranked as countries with a relatively high military burden among NATO and EU members. Based on SIPRI data, during 1960–2014 an annual average of 3.9 percent of GDP was allocated to defense by Greece, and 3.4 percent by Turkey, while the NATO average was 2.9 percent. In the post-bipolar period, 1990–2014, compared to the European Union's average military burden of 1.9 percent, Greece's was 2.9 and Turkey's 3.2 percent. Not surprisingly, both have featured as case studies, either as a single country or as dyad, in many published papers. One strand of this literature has set out to examine the extent to which the military outlays of one country affect those of the other. This theme has been examined either in the context of an arms race or in terms of a demand for military spending empirical set-up. Methodological problems and weaknesses in the accumulated body of literature have been thoroughly reviewed and hence, for reasons of brevity, we refrain from repeating a similar exercise here. In any case, our aim is substantially narrower since we concentrate on the post-bipolar period (1990–2014), focusing mainly on defense-related changes and developments in the case of Greece and empirically examining to what extend they have influenced Greek military expenditure.[1]

Historically, Greek–Turkish relations have been bumpy, with a number of issues dividing the two countries. Bilateral relations have been characterized by a repeating cycle of tension, negotiation, and tension. In the 1990s, both a sharp deterioration in this relationship and then a remarkable improvement was witnessed. The 1996 Imia crisis when a military flare-up was narrowly avoided only after stern intervention by the United States, the Öcalan affair in 1999, and the proposed deployment of Russian-made S-300 anti-aircraft missiles in Cyprus, are perhaps the most prominent cases of the deterioration in Greek–Turkish relations during this period. The 1999 earthquakes in Turkey and in Greece, and the mutual assistance offered by both, acted as the impetus of a rapid and probably unprecedented rapprochement that was further solidified by Greece's decision at the 1999 Helsinki EU Summit to consent to the granting of EU candidate status to Turkey. Since then, Greek–Turkish relations have, in comparative terms, thrived at the level of the economy and civil society, accompanied by bilateral agreements in what are considered as low-politics spheres. Trade has increased remarkably and significant economic cooperation emerged in the banking and tourism sectors. Nevertheless, there has been no fundamental progress toward a comprehensive Greek–Turkish settlement covering long-standing bilateral disputes that form the strategic core of their differences such as for instance the Cyprus problem, the delineation of territorial waters and of the continental shelf. Hence, Turkey still features prominently in the Greek security agenda. The question is whether this bears a statistically traceable impact on the Greek military budget or whether other factors exert a more significant influence.[2]

Security shifts and economic fluctuations

It is quite rare for two countries to see their systemic position in their regional relations and balance of power shift as rapidly as has been the case for Greece and Turkey over the past two decades or so. In the early 2000s, Greece entered the eurozone,

Table 1: Average GDP growth rates and military expenditure as a percent share of GDP

	Greece	EU	Eurozone
	GDP growth rates (%)		
1990–99	2.1	2.2	2.2
2000–08	3.6	2.3	2.1
2009–14	–4.8	0.1	–0.2
	Military expenditure (% of GDP)		
1990–99	3.5	2.2	2.0
2000–08	2.9	1.8	1.7
2009–14	2.6	1.6	1.5

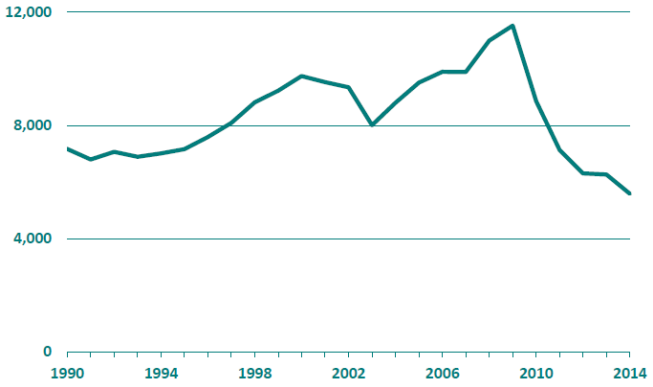

Figure 1: Greek real military expenditure (in constant 2011 USD).
Source: Stockholm International Peace Research Institute (SIPRI).

an accession that was widely viewed as an important strategic achievement that strengthened the country's economic and political presence in the greater region. Roughly at the same time, the Turkish economy was experiencing a deep economic crisis, with important and long-lasting political ramifications. Less than ten years later a fundamental domestic political power shift was completed in Turkey with Erdogan's AKP party emerging as the strongest pillar in domestic politics, having swept away the old Kemalist partisan scene. Concurrently, a remarkable dynamic economic recovery unfolded, albeit now with clear signs of an impending slow-down. Turkey's ascent to one of the most vibrant G20 economies coincided with Greece's debt crisis that brought

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about an unprecedented recession with widespread social suffering and discontent as well as profound changes in the domestic political and partisan scene. As can be seen in Table 1, the sovereign debt crisis that erupted in 2009, and the concomitant deep and prolonged recession, caused a traumatic reversal in the economy's performance. From the healthy growth rates of the 1990s and for most of the 2000s, the economy plummeted into an unprecedented free-fall from which it still has to recover with a steady pace. The debt crisis brought about stern austerity measures and imposed severe fiscal cutbacks with across-the-board decreases in public spending. As a share of GDP, military expenditure does not seem to have been substantially affected, however. From an average of 3.5 percent in the 1990s and 2.9 percent in the pre-crisis 2000s, it marginally declined to 2.6 percent during the recession period (2009–2014), still being appreciably higher than the EU and eurozone averages (Table 1). However, the GDP share of military expenditure does not entirely reveal the size of the cutbacks that took place in the defense budget. In real terms, military spending in 2014 was more than 50 percent lower as compared to 2009 (Figure 1). Based on SIPRI data, the 2014 level of Greek military expenditure was, in real terms, the lowest throughout the entire post-bipolar period. Indeed, in 2014, it was only slightly higher than the level it was at back in 1973. (According to SIPRI data, Greek military spending in 1973 was around USD4.9 billion and in 2014 USD5.5 billion. It reached its highest level in 2009, the year the current economic crisis started unfolding, at around USD11.5 billion.)[3]

Roughly at the same time that the Greek sovereign debt crisis erupted, an important change in the geopolitics of the region took place that had a direct bearing on Greece's regional position. Due to a series of diplomatic episodes and confrontations between 2008 and 2012, the Israeli–Turkish relationship entered into a period of tension and distrust, interrupting decades of cordiality and cooperation. The ensuing rift, and the gap it created in Israel's security strategy, was rapidly substituted for by Israel's quick forging of political, military, and energy relations with Greece and Cyprus. For

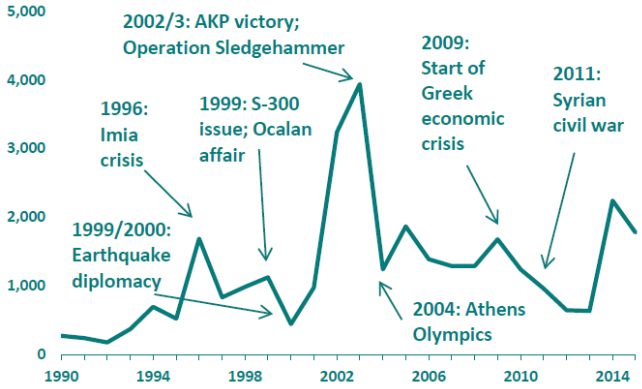

Figure 2: Number of Greek airspace violations by Turkey. *Source*: Greek Ministry of Defense, General Staff.

example, after Turkey suspended all joint military exercises with Israel, Greece offered to step in, replacing Turkey as a strategic defense partner for Israel. Energy reserves were the catalyst for improving bilateral relations between Israel and Greece, as the latter is seeking to upgrade its energy profile both in the short term, as a transit state for energy flows of natural gas coming from Israel and Cyprus to the European market, and, in the long term, as an energy producer. A similar pattern of events unfolded in the case of Egyptian–Turkish diplomatic relations following the 2013 coup that overthrew the Morsi government in Cairo. The deterioration in bilateral relations between Egypt and Turkey paved the way to improvements in Greece's diplomatic relations with Egypt, sealed by joint Greek–Egyptian military exercises.[4]

Although this epigrammatic summary of developments can hardly claim to be a comprehensive analysis of events, and of the changes the two countries have gone through over the last two decades or so, it does provide a backdrop highlighting the fluctuations that characterized their respective domestic scenes, affected their mutual relations, and their regional roles. Both aspire to become regional game changers and energy hubs in the eastern Mediterranean, a region characterized by a remarkable, ongoing reconfiguration of the balance of power and competition for hegemony.[5]

As noted, no major adverse episode has marred Greek–Turkish bilateral relations since the late 1990s. If anything, they seem to be going through a prolonged period of calm and cordiality. Nevertheless, no real headway has been made in the strategic core of the issues that divide the two countries. It should, however, be mentioned that, in recent months, negotiations for a resolution to the Cyprus problem have resumed, creating expectations of an impending settlement to this long-standing problem that has been a major thorn in Greek–Turkish relations. Yet this optimism may not convert into real and concrete progress given that thorny issues on property, territorial adjustments, demographic composition, security arrangements, and power-sharing still seem to be irreconcilable. Against this backdrop of economic and geopolitical changes, we now turn to examine empirically whether and, if so, to what extent Greek military expenditure is influenced by Turkish military expenditure in the post-bipolar period.

Is it the economy?

Military expenditure essentially reflects the cost of producing military power. It represents a country's outlays to purchase the inputs needed for the production of military capabilities and strength. Given the primarily strategic nature of military expenditure, its evolution and fluctuation over time are hypothesized to reflect changes in the international system and the global or regional security environment. Dyads, such as Greece and Turkey, engaged in long-term disputes and conflicts, tend to get locked in persistently high levels of military spending. In the relevant defense economics literature, several factors are hypothesized as explanatory determinants of military expenditure. Standard estimating models for the demand for military spending typically assume that, among other things, such expenditures are determined by economic constraints, external threat(s), and spill-ins from allies. In line with this literature we assume that an individual country, in our case Greece, faces a constant elasticity demand function for military expenditures given in equation (1):

$$(1)\ M_t = A p_t^{\beta},$$

where M_t is military expenditure, p_t is the GDP deflator since there are no indices of the price of military activity for Greece, β is the elasticity of demand, and A includes various demand shifters. The demand shifters in our model include both domestic and external determinants. The external threat-capturing variables include Turkish military expenditure (*TRmilex*) and Greek airspace violations by the Turkish air force (Figure 2). The airspace violations variable has been used in a number of studies as an index of military tension. Such violations can be viewed as a signaling game between two countries over contested territory, in this case along the length of Greek airspace, communicating objections or claims that constitute a process of coercive diplomacy but in practice can be influenced by a cohort of factors ranging from prevailing weather conditions to domestic and external causes.[6]

As seen in Figure 2, the general trend of the time series of Greek airspace violations is an upward one. An interesting and

Table 2: OLS estimates of demand equation, 1990-2014

Dependent variable: Greek military expenditure (constant 2011 USD)

	Coefficient	*p-value*
lnTRmilex(t–1)	–0.519	0.109
lnGDP(t)	**0.659**	**0.014**
lnGDPdeflator(1)	**–0.487**	**0.048**
lnGRcivilexp(t–1)	0.623	0.070
lnGRpop(t–1)	0.326	0.629
lnUSmilex(t–1)	**–0.755**	**0.000**
Violations(t–1)	–0.021	0.517
R-squared	0.84	
S.E.	0.078	
DW	1.201	
Log likelihood	31.095	
Serial correlation	$\chi2$ (1) = 0.144	
Functional form	$\chi2$ (1) = 0.284	
Normality	$\chi2$ (1) = 0.814	
Heteroskedasticity	$\chi2$ (1) = 0.402	

Notes: Serial correlation test: Lagrange multiplier test of residual serial correlation; functional form test: Ramsey's RESET test using the square of the fitted values; normality test: based on a test of skewness and kurtosis of residuals; heteroskedasticity test: based on the regression of squared residuals on squared fitted values. Coefficients in bold type-font are highlighted at the conventional 5% level of statistical significance.

perhaps to some extent illuminating exercise for our purposes here is to try to identify events that might have affected the number of violations in specific years. A full econometric examination of the determinants of the number of violations is well beyond our scope here, so we simply restrict ourselves to a visually-based approach. We already referred to examples of important events that characterized Greek–Turkish bilateral relations in the 1990s, causing oscillation from a major military crisis (Imia, 1996) to a rapid rapprochement induced by the 1999 earthquakes. Both seem to have left an imprint on the time series in question (Figure 2). But this is merely a visual observation and by no means a robust assertion supported by hard evidence.[7]

A similar rise-and-fall pattern is seen from 2000 to 2004. Internal developments in Turkey might explain the sharp increase in airspace violations observed in 2002 and 2003. Allegedly, the possibility of electoral victory of Erdogan's AKP party in 2002, and his becoming Prime Minister of Turkey in 2003, set in motion a secularist military plan, codenamed Operation Sledgehammer, aimed at eventually overthrowing AKP in a coup. It has been claimed that the plan involved, among other things, staging a major military crisis with Greece via dogfights between the fighter planes of the two countries and the shooting down of a Turkish pilot. Hence, the sharp rise in the number of violations in 2002 and 2003 and the equally sharp decline once the alleged plot was thwarted. The decline coincides with the 2004 Olympic Games held in Athens. Airspace violations are a risk-generating mechanism since they often involve dogfights between armed jets and in the past have claimed pilots' lives. An accidental incident during a mega-sports event of global interest would have proved diplomatically embarrassing.[8]

As a final illustration, the Greek economic crisis that started in 2009 appears to have affected the number of violations up to 2013, as again can be seen in Figure 2. Similarly, the onset of the Syrian civil war in 2011 and the subsequent major security challenges this caused for Turkey on its southeastern boarder can be also cited as a possible factor explaining the downward trend exhibited during these years.[9]

We now return to equation (1). To capture alliance spill-ins we included U.S. military expenditure. In the geopolitics of the region in general, and Greek–Turkish relations in particular, the United States acts as a strategic supervisor and regulator given its hegemonic role in the NATO alliance as well as in global politics. The possible domestic demand shifters that are included are GDP as the resource constraint, population, and civilian (nonmilitary) public spending. All expenditure variables and income (GDP) are in constant prices (2011 USD). We rewrite equation (1) as:

$$(2)\ lnM_t = \beta\, lnp_t + lnA_{(t-1)}.$$

The estimated equation (2) explains a high proportion of the variance of the dependent variable, with an R^2 of 0.84 (Table 2). The results are fairly consistent when it comes to the coefficients of the external threat variables. Neither Turkish military expenditure (*TRmilex*) nor the military tension index (*airspace violations*) seem to exert any statistically significant influence. Yet the findings do seem to strongly suggest that during the period in question, the *domestic* demand shifters, with the exception of population, are the ones that influence

Greek military expenditure with an income elasticity of 0.66 and the elasticity of total civilian expenditure of 0.62. The alliance spill-ins, approximated by U.S. military spending, are also statistically significant. The negative sign of the relevant coefficient can be tentatively interpreted as indicating free-riding behavior on the part of Greece. Overall, on the basis of the results obtained, it would appear that the domestic economy in the case of Greece, emerges as a major factor that influences its military outlays. In other words, the economy is a formidable constraint that supersedes security needs and challenges.[10]

Conclusion

Over the past two decades or so, Greece underwent significant changes that affected its position in the regional geopolitical setting of the eastern Mediterranean. Coming off a relatively thriving economy in the 1990s and early 2000s, it is now struggling with an acute recession caused by its sovereign debt crisis. In terms of military expenditure, it invariably ranked as one of the countries with a comparatively high military burden, justified in terms of the external security challenges it faced. But, allowing for how the selection of the time period and the methodology employed can bear on the results, the findings reported in this article suggest that the upward and downward trends observed in Greek military spending (Figure 1) are not so much driven by changes in Greek–Turkish relations, that up to the late 1990s oscillated from tension to negotiation and rapprochement, but by Greece's (in)ability to allocate scarce resources to national defense. Although Turkey features prominently on the Greek security canvas, it appears to be the economy that ultimately moves the defense sector paintbrush used to cover security needs and gaps. Hence, in periods of relative economic affluence, increases to the defense budget were possible. The onset of the acute economic crisis in the late 2000s halted this ability. While the sharp reduction in Greek military expenditure observed since then coincided with a period of calm and cordiality in Greek–Turkish relations, as no major incident has marred their bilateral affairs in the last decade and a half, the statistical evidence suggests that it is the state of the economy, rather than the state of Greek–Turkish security affairs, that is largely responsible for Greece's declining military expenditure.

Nevertheless, the underlying strategic differences between the two countries have not been resolved and, hence, it is possible that they can flare up and lead to a renewed period of tension in the future. However, as two analysts point out, on the one hand, investing in the economy is a precondition in order to attain military deterrence and security. Yet, on the other hand, as a country becomes economically stronger and more affluent, confrontation becomes less of a policy option since too much is at stake to risk in a conflict. Hence, they conclude that "the best way to security may be trough economic growth."[11]

Currently, both Greece and Turkey face challenges that require cooperation rather than confrontation. The increasing flow of irregular immigrants and refugees pose substantial difficulties for both countries, and to the EU. These difficulties may form a basis on which mutual coordination can lead to careful steps forward in their bilateral relation. But they can also bring to the surface long-term strategic differences over the delineation of territorial waters. Such differences can be further accentuated by both countries' aspiration to play a key role in the regional energy game that is unfolding. Eventually, this will involve the delineation of exclusive economic zones both between Greece and Turkey but also with Cyprus, Egypt, and Israel. This multiplayer process can prove very thorny, leading to a deterioration in bilateral relations. However, currently both countries are preoccupied with more pressing problems: Greece with the efforts to get its economy back on track, and Turkey with important security challenges on its southeastern border and the potential threats from a *de facto* Kurdish state emerging from the turmoil in the region.[12]

Notes

1. In many published papers: A comprehensive and critical survey can be found in Brauer (2002, 2003). Arms race context: Recent examples are Şahin and Özsoy (2008); Öcal (2002); Öcal and Yildirim (2009); Michail and Papasyriopoulos (2012). Methodological problems: Brauer (2002, 2003).

2. Historical relations: See, e.g., Dokos and Tsakonas (2003); Sonmezoglu and Ayman (2003). Tension, negotiation, tension: Gunluk-Senesen (2001, 2004). Öcalan affair: The leader of the Kurdish guerrilla group PKK which engaged in armed struggle for the creation of a Kurdish independent state. The PKK is considered as a terrorist organization by the USA, NATO, and the EU. Öcalan has been in jail since his arrest. Rapprochement: Due to the catalytic role of the earthquakes, the diplomatic rapprochement was termed "earthquake diplomacy." Long-standing bilateral disputes: (see, e.g., Sonmezoglu and Ayman (2003); Dokos and Tsakonas (2003); Kollias and Paleologou (2011).

3. Greek domestic political and partisan scene: See, e.g., Vasilopoulou, Halikiopoulou, and Exadaktylos (2014); Katsimi and Moutos (2010); Onis (2009, 2012); Kotios, Pavlidis, and Galanos (2011); Onis and Kutlay (2013); Mitsopoulos and Pelagidis (2015).

4. Cordiality and cooperation: Bir and Sherman (2002); Athanasopoulou (2003); Tsakiris (2014). Turkey was the first Muslim country to recognize Israel *de jure*, signing a commercial agreement with it in 1950. Energy profile:

Tziampiris (2015); Stergiou (2013, 2015); Good (2014); Tsakiris (2014).

5. Reconfiguration: Stergiou (2015); Eksi (2010); Andoura and d'Oultremont (2013); Dokos (2011); Onis and Yilmaz, 2009; Rumelili (2007).

6. Several factors: Smith (1989, 1995); Douch and Solomon (2014). Airspace violations: Pitsoulis and Schwuchow (2014); Kollias and Paleologou (2007); Kollias (2004). Signaling game: Pitsoulis and Schwuchow (2014).

7. Airspace violations: Delving into the legal and other technicalities associated with the practice is beyond our scope here. A summary presentation of such issues can be found in Pitsoulis and Schwuchow (2014), Kollias and Paleologou (2007). Visually-based approach: Pitsoulis and Schwuchow (2014) offer a technically thorough treatment of the time series.

8. Diplomatically embarrassing: Pitsoulis and Schwuchow (2014).

9. Final illustration: Pitsoulis and Schwuchow (2014).

10. The economy supersedes: In Cicero's words: *Nervos belli, pecuniam* (the nerve of war is money).

11. Two analysts: Dunne and Tian (2013).

12. Unfolding energy game: Tziampiris (2015); Stergiou (2015); Good (2014); Tsakiris (2014); Eksi (2010).

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Turkey's changing security perceptions and expenditures in the 2000s: Substitutes or complements?

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Abstract

This article explains changes in Turkey's security perceptions after the current ruling party, the AKP, came to power. It focuses on how Turkey tried to change the structure of conflictual relations with countries it has long viewed as sources of threat. Focusing on Syria, especially, the article delineates economic tools for conflict reduction and regional integration employed by Turkey and analyzes the challenges and main obstacles that the Turkish government has faced, especially after the Arab spring upheavals. The article then devotes attention to Turkey's military modernization efforts launched to cope with the new threat environment and from there moves on to elaborate on the effect of security policy preferences and design on Turkish security-related resource allocation since the early 2000s. The intermingled nature of internal and external security policies calls for broadening the context of the economic aspects of security to include police, gendarmerie, and coast guard services along with the military. Descriptive analysis of on-budget components and off-budget facilities shed light on Turkey's recent position in the international arena as an important military spender and arms importer.

States do not treat disagreements over all types of issues the same. In particular, territorial disagreements are much more likely to generate crises that, in turn, can produce high probabilities of escalation to interstate war. Explanations for why territory triggers crises and wars include tangible as well as intangible elements. Among the former are ownership of, or access to, natural resources as well as the desire to access sea lanes or other commercial transport routes or factors related to ethnicity or the religious preferences of populations. Yet, what drives states and peoples willingly to make tremendous sacrifices for territory can ultimately only be understood through intangible elements. Territory has high symbolic value, for example as a historic or religious homeland, and is one reason why it is relatively easy for governments to mobilize domestic support regarding territorial issues. Territorial claims often encourage states to believe in power politics, and this includes military build-ups and the forming of alliances. In contrast to proponents of realism, though, liberal peace scholars often assume that economically interdependent states, connected by foreign direct investment and trade, can promote peace across borders.[1]

The first part of this article addresses the following questions: (1) Under what type of conditions does Turkey appear to choose economic tools of conflict resolution rather than leaning toward military ones? (2) What is the role played by "Turkish identity"? (3) What challenges and obstacles may have impeded the success of Turkish policy when it prioritized the economic means?

Turkey's security perceptions, policies, and postures need to be viewed also in light of its economic capacity. As it turn out, its economic growth has given it the means for greater military expenditure, and yet such spending growth has not occurred. The second part of the article therefore elaborates on Turkish preferences regarding its internal and external security policy design, and their effects on resource allocation, and evaluates security-related on-budget and off-budget data.

The new approach to security concerns

Although Iran, Iraq, and Armenia were part of Turkey's threat perceptions in the 1990s, Turkey's major concerns then were Greece and Syria. In military terms, Greece was the primary source of anxiety due to unresolved problems concerning the Aegean Sea. The Kardak/Imia crisis of 1996 between Turkey and Greece, for instance, demonstrated how unresolved issues over the Aegean could bring the two countries to the brink of war. The likelihood of war between Turkey and Syria, however, because of the latter's claims to Turkish territory and its support of the Kurdistan Workers' Party (Kurdish: Partiya Karkerên Kurdistanê, or PKK), was not considered high, not only because of the power asymmetry between the two countries but also because Syria toned down its claims (although the area remained on Syrian maps) after the

Arab–Israeli conflict became a Syrian priority. Nonetheless, Turkish defense planners recommended to prepare for all eventualities. According to ex-Ambassador Sukru Elekdag, the Turkish Armed Forces (TAF) should be prepared to carry out "two-and-a half campaigns," that is, be able to conduct two full-scale operations simultaneously along the Aegean and southern fronts and a "half war" that might be instigated from within the country.[2]

With the rise to power in 2002 of the Justice and Development Party (Turkish: Adalet ve Kalkinma Partisi, or AKP), a party rooted in Turkey's Islamist then-opposition, not only were new social and political approaches introduced, but a new understanding to address Turkey's various security problems was adopted. Anxiety felt by AKP cadres regarding attempts of the secular opposition and the military to curb its new power deeply affected how Turkey's security concerns and the TAF were viewed. AKP circles largely thought that, in the past, external security threats were purposefully exaggerated in order to increase the role of the Turkish army in political life. The AKP believes that it rescued Turkey from such fears and insecurities in a way that would enable it to approach foreign policy and regional affairs from a new, different angle. This line of thought asserted that there then should emerge a consequent structural change in Turkey's relations, concentrating on diplomacy and foreign relations rather than on how to cope with threats originating from its own military. As a proponent of neoliberalism, the AKP leadership relied on the premise of coping with external threats emanating from territorial claims through the development of trade and economic relations with neighboring states. Turkey's growing economic interdependency with the Kurdish Regional Government (KRG) in Iraq played an important role in encouraging the AKP to apply the same understanding to Turkey's relations with other countries. Turkish–Iraqi relations thus underwent a dramatic improvement since 2007 as KRG became more than a simple market for Turkey. As a potential source of natural gas, improved relations with Iraq/KRG were regarded as an asset for Turkey in its attempt to become an energy corridor to Europe.[3]

Terms introduced by the Turkish government to explain its endeavors included a "proactive," "multidimensional," and "rhythmic" diplomacy as opposed to "status quo-oriented," "reactionary," or "defensive" approaches. In this vein, soft-power assets of Turkey were highlighted, engagement and economic interdependence emphasized, and mediation roles promoted. These efforts were in sharp contrast to Turkish foreign policy as practiced during most of the 1990s, which was highly securitized and rested upon mostly military means and the balancing of alliances, as in the case of the Turkish–Israeli alignment of 1996 against Syria. Thus, Ankara now favored the Annan Plan for achieving a peaceful resolution of the Cyprus conflict, touted the economic benefits of conciliation with Greece as depicted in their growing bilateral trade, and signed two protocols in 2009 with Armenia aimed at normalizing relations. The improvement in Turkish–Syrian relations also manifested itself in trade and economic relations, but beyond that the Turkish government aimed at transforming the border itself to become a "meaningless" entity between the two countries.[4]

The article examines Turkey's changing security perceptions, policies, and postures since the rise of its current ruling party, the AKP, in the early 2000s and places these in the context of its internal and external security-oriented budget allocations. It finds that in spite of a prolonged period of economic growth, the country's outlays on military expenditures have essentially stalled while allocations to internal security services have risen drastically.

Yet, to AKP's disappointment, in the end the Annan Plan failed and Greek–Turkish detente could not be extended to the security field, leaving key differences between the countries unresolved. Furthermore, new concerns, e.g., the decision by the Greek–Cypriot government in 2007 to develop natural gas fields on the southern coast of the island—which it claimed as its own Exclusive Economic Zone—antagonized Turkey and became a litmus test to show whether economic opportunities would bring peaceful solutions or fierce competition and crisis.[5]

Lastly, efforts to normalize the relations initiated by Armenia eventually paused after President Serzh Sarkisian suspended the ratification process because Turkey sought to link ratification of the protocols with progress in a separate dispute between Armenia and Azerbaijan, over the region of Nagorno-Karabakh. Armenia objected to any such conditions and asserted that Ankara should proceed unconditionally.[6]

An imagination beyond borders

Within the context of a "zero problems with the neighbors" policy, developing good relations with the "Muslim Middle East" became the highest priority of Turkey during the AKP era. Obviously, this shift marked a change from Turkey's traditional foreign policy that looked West more than it looked East or South. What made it unique, however, was the attempt to broaden the definition of self-identity such as to include geography beyond Turkey's official borders. An imagination of a Muslim *cemaat* (community) was the main motivation of the AKP leadership in its pursuance of an ambitious policy to foster good relations with the region.

Many academics have pointed out the close relationship between identity and territory. In the field of security, defining identity beyond borders often has resulted in territorial demands in the case of ethnic affiliation or attempts to build a supra-national authority as in the case of the European Union. In the AKP's vision, the alternative to the official abolishment of borders was to transform them into places that would offer an enhanced ability for interaction, exchange, and enrichment. While this endeavor was defended in general as an attempt to realize "Turkey's historic reintegration into its immediate neighborhoods and hence correct an anomaly of the Cold War years," Turks and Arabs in particular were viewed like members of a separated family who were eager to reunite.[7]

Actually, soon after the formation of the cabinet the AKP had to deal with the problem of the United States intending to invade northern Iraq using Turkish territory. Despite efforts by Prime Minister Recep Tayyip Erdogan to pass a bill allowing this, the Turkish parliament rejected it. Ironically, that event catapulted to new heights the popularity of the Turkish government in Arab public opinion.

In the following period, Turkey took important steps to develop and diversify multilateral and bilateral relations with the Arab world. The Turkish Foreign Ministry established consultation mechanisms with a number of Arab countries, including Egypt, Syria, Jordan, Lebanon, Tunisia, Morocco, Libya, Oman, Qatar, and Bahrain. Turkey also made great efforts to increase its stature in the Persian gulf by developing better economic relations with hydrocarbon-rich countries like Kuwait, Qatar, and Bahrain.[8]

While the benefits to be gained from the AKP's endeavor to reintegrate the Middle East were supposedly plenty, the development of economic relations and particularly trade was the most highlighted. Referring to the "trading state" concept of Rosecrance, Kirisci argued that "Turkey has been in the process of becoming a trading state, as foreign trade has steadily grown and come to constitute a growing proportion of its economy."[9]

Multi-faceted cooperation with Syria

Turkey's multi-faceted cooperation efforts constituted the most elaborate example of the kind of tools selected for resolving territorial conflicts and achieving regional reintegration. In 2004, during a visit by Turkish Prime Minister Erdogan, Turkey and Syria signed a free trade agreement and decided to put their differences behind them. The Turkish–Syrian Regional Cooperation Program became operational in 2006, aiming to develop technical, economic, cultural, and scientific cooperation. Its aim was to facilitate regional development by financing projects that would create employment as a priority. In return, Syrian President al-Assad's visit to Istanbul on 16 September 2009 was pivotal for taking cooperation between the two countries to the strategic level through the establishing of the Syrian–Turkish High-Level Strategic Cooperation Council, and which resulted in signing 51 agreements and opened a new phase in bilateral relations with the decision to lift visa requirements. In January 2010, Turkey and Syria signed a memorandum of understanding outlining their plan to construct a "friendship dam" on the Orontes River, long planned but never realized because of the Hatay question.[10] On 10 June 2010, the foreign ministers of Turkey, Syria, Jordan, and Lebanon agreed to set up a "high-level quartet cooperation council" and within this framework decided to establish a free trade zone and a visa-free travel regime among its nationals. The absence of objections by Syria to the establishment of a center in Iskandarunah was regarded as indirect recognition of Turkish sovereignty over the area. Moreover, Turkey and Syria decided to jointly operate border gate facilities in accordance with the Protocol of Cooperation on Procedures on the Movement of Passengers and Goods signed in Lattakia in October 2010 during the 2nd Ministerial Meeting of the Syrian-Turkish High-Level Strategic Cooperation Council. The shared border process first started in Nusaybin, a district in the province of Mardin, which is one of the border areas once riddled with land mines.[11]

Security concerns regain priority

Reminiscent of steps taken in Europe in the post-second world war era, which laid the foundations of today's European Union, Turkey's regional integration efforts, as demonstrated in the Syrian example, involved a growing number of high-level visits and cooperation pacts on a variety of issues ranging from culture to security. What was missing from the AKP's vision, however, was accounting for the internal vulnerability of the oppressive regimes Turkey contracted with. Thus, lifting visa obligations, facilitating the flow of people across borders, and expanding communication constituted important parts of Turkish policy up until the Arab upheavals in spring 2011.

Initially, the high level of self-confidence related to the apparent success of the "Turkish model," led the AKP to believe that if the Turkish experience was inspiring, Ankara would be the leading source for the new regimes established after the fall of authoritarian rulers. Besides, according to the principle suggested by Davutoglu "if Turkey will be affected in the next stage, it will lead the process today," no matter whether it means intervening in domestic affairs.[12]

In this regard, the election of Muhammad Morsi in Egypt and a like-minded conservative government in Tunisia were considered steps toward a new order in the region. In fact,

Turkey was reading regional developments through the lens of its own experience and empathizing with them. Even after a coup toppled President Morsi in Egypt, AKP officials argued that the deposed president's popularity would result in his return to power. This argument was underpinned by the steadfast belief that all of the region's dictatorial regimes were either doomed to fail or be overthrown by "the people," who will then elect a "man of the people." Yet experience showed that the fall of an authoritarian regime does not guarantee that democracy will prevail: An unruly civil war might ensue, as in Libya, or authoritarian rule could stay on much longer than expected, as illustrated by the Syrian case. The developments in Libya, Egypt, and Syria resulted in huge economic losses for Turkey. Yet it was the Syrian conflict that posed the most serious threats and risks to Turkey's security.

Syria as a source of threats

As all the steps taken to make the Turkish–Syrian border "meaningless" proved, Ankara had high expectations of its improved relations with Syria. But when it became clear that it was impossible to convince the latter's leadership to realize reforms, the AKP leadership took a strong stance against the Assad regime. Remarks by President Erdogan point out how identity perceptions shaped Turkey's approach: "We do not see Syria as a foreign problem, Syria is our domestic problem because we have an 850 kilometer border with this country, we have historical and cultural ties, we have kinship." The lesson learned from the Libyan case also was very influential in determining the course of Turkey's actions. Accordingly, if Turkey would leave the determination of Syria's future to extra-regional powers, it could be left out of any deal and might find itself facing a number of risks and threats. Turkey soon became the main staging ground for the Syrian opposition in exile. Yet Turkey's effort to unite and strengthen the opposition forces under a common umbrella favorable to Turkey was not an easy task.[13]

When peaceful rallies escalated into violent conflict and gradually transformed into Syria's civil war, Turkey came to host over 2 million refugees. Adopting an open-door policy came at a high price. As of September 2015, Turkey spent USD7.6 billion on Syrian refugees while international assistance fell strikingly short at USD418 million. The estimated monthly cost of sustaining 25 camps is over USD2 million. The refugee flow strained Turkey's relations especially with Greece. While Turkish authorities asserted that "Turkey has been left alone with this crisis," Greek authorities accused Turkey of aggravating the refugee crisis as a result of the high number of refugees crossing the Aegean Sea.[14]

The war in Syria and the risks and threats it posed for Turkey resulted in a new approach to border security. To reduce illegal border crossings, Turkey decided to build a two-fenced border system, including roads passing through two-section, wire-mesh fences with observation towers. The government has already renewed 145 km of wire fence and has set up 90 km of new fences on the border. A total of 450 km in other parts of Turkey's border with Syria are to be protected by a new moat. The cost of these measures, including drones, thermal cameras, and motion sensors, will be around 4.2 billion Turkish liras (see the section on the financials later on in this article). Half the personnel of the renewed effort to reinforce border security have been assigned to the Syrian border.[15]

The ongoing civil war in Syria

By embracing the opposition and severing its ties with the regime in Syria, Turkey sought to achieve two goals: To overthrow Syria's regime and to convince Syrian Kurds to join the armed opposition struggle there. Neither Turkish calls for the establishment of a security buffer zone—which is to serve as a refuge for displaced Syrians, a base for the opposition, and as a cover for air strikes to cripple Syria's air force—nor its search to attract international support for military intervention received positive responses from the West. Moreover, the war against Islamic State of Iraq and Syria (ISIS) benefitted Kurds in establishing an autonomous body with its own military, security, administrative, and economic institutions. Kurdish attempts to impose a *fait accompli* on the ground caused great anxiety, with Turkish concerns focusing on the possibility of Kurdish expansion and linking to other areas in the far northwest and the possibility of accessing the Mediterranean. These developments raised Turkish fears that Kurds' ultimate goal is the establishment of an independent state in the region. The disillusionment with the West, particularly the United States, led the AKP to argue that "the West is trying to create a second Sykes-Picot out of fragmented and failed states to foster its own rule over the region."[16]

Russia's direct involvement in Syria further complicated the problem. Turkish–Russian relations became strained after the Turkish Air Force downed a Russian fighter jet in November 2015. Immediately thereafter, Moscow started to support Syrian Kurdish fighters, considered by Turkey to be "terrorists." The economic implications of the crisis were also worrying. Yet Turkey's most important concern regarding Russia is not the possible economic losses or problems that could arise as a result of its dependence on Russian gas, but rather the future of Syria itself, the most critical element of disagreement between Russia and Turkey today.

Turkey's relations with Iran also became strained as a result of the war in Syria. The decision to allow NATO to deploy a

radar as part of its antimissile system came at a time when Turkey and Iran took different approaches toward Syria. For Iran, the fall of the Assad regime would be considered a threat to its vital interests, while Turkey does not seem to give up its regime-change approach toward Syria. Since the foundation of the Islamic Republic, Syria has been considered Iran's closest state ally. Importantly, the latter provides the crucial link between Iran and Lebanese Hezbollah, acting as a hub to transport personnel, weapons, and finances. Despite the new beginnings sought by the United States, Iran still feels the need of ensuring its own security, systematically trying to increase its strategic depth in Iraq and in Syria.

Perceived threats and risks

According to Turkish security sources, the developments in the Middle East and North Africa no longer support positive expectations regarding security and stability in the region. The deteriorating situation in Syria and Iraq, and the activities of the Democratic Unity Party (Kurdish: Partiya Yekîtiya Demokrat, an offshoot of the PKK) and of ISIS in these countries and on Turkish territory, are high on the list of perceived threats.[17]

Modernization efforts

According to Turkish Chief of General Staff, Hulusi Akar, the current and anticipated future conflicts are of a hybrid character, comprising conventional and nonconventional threats. With the increasing complexity of its dimensions and actors, the security and war situation has become difficult to predict, leading Turkey's military to adopt a "security concept" rather than a "defense one." Thus, Turkish military strategy calls for highly adaptive, flexible, resistant, and agile forces, capable of taking quick decisions with a high level of combat preparedness. The task of Turkish military forces, as laid out in Article 35 of the Internal Service Code, shows that the front line could lie beyond Turkey's borders.[18]

The assertive vision and discourse developed by Turkey in recent years and the deteriorated threat environment necessitated an increase in its operational military capabilities. The 2012–2016 Strategic Plan announced by the Turkish Undersecretariat for Defense Industries demonstrates the priorities with regard to military modernization. One of the most striking features of force modernization efforts involves building a domestic missile defense capability. Indeed, the same Turkey that needed NATO's missile defense capabilities against Saddam Hussein's ballistic missiles and weapons of mass destruction during the first Persian gulf war was forced to again request NATO missile defense capabilities on its territories because of the civil war in Syria and Syria's strategic weapon capabilities. Moreover, the Dutch decision to withdraw Patriot antimissile systems urged Turkey to develop its own systems rather than to rely on NATO in crisis situations.[19]

Ankara took three steps to fortify its defense against strategic weapon systems. First, its air force concept changed to include missile defense. Second, the Undersecretariat for Defense Industries launched a Regional Long Range Air and Missile Defense System. Third, an Air and Missile Defense Combat Command was formed within the air force, and an Air Defense Command was created in Eskisehir, which is responsible for the administration of missile defense.

Greece, long the focus of Turkey's military strategic calculations, does not possess land-to-land ballistic missile capabilities nor weapons of mass destruction warheads, only ATACMS tactical ballistic missiles. However, as of 2013, Russia has started to deploy on Armenian territory SS-26 Alexander missiles with a range of 400 km and capable of carrying warheads of payloads between 480-700 kg. With modifications, these missiles could carry nuclear warheads. Most importantly, they are designed to mislead ballistic missile defense systems. In addition, allegations regarding Russia's violation of the Intermediate Nuclear Forces Treaty (INF) also cause Turkish discomfort. If true, and if the missiles were to remain in Armenia, Turkish cities like Diyarbakir and Malatya that are important military and administrative regions and are the headquarters of the 3rd Army, would lie within the range of those missiles.[20]

In all this, undoubtedly, economic growth is the key enabler of Turkey's modernization efforts. While territorial problems and regional challenges create a desire for military modernization, military power as a source of status is also a motivating factor. In this respect, at least, Turkey displays characteristics similar to other regional powers such as Brazil, India, and South Africa, all with generally growing economies, and of all which play key economic and political roles in their respective regions and engage in significant military modernization programs as well. Unlike these regional players, however, Turkey essentially has not increased its military expenditure—despite its security challenges. So, what makes Turkey seemingly different?

The financials

In terms of resources expended on the military, Turkey ranks 15th in the world, slightly below the United Arab Emirates. Turkey also counts among the world's top importers of major weapons, ranking third in the Middle East, after Saudi Arabia and the United Arab Emirates. Compared to Turkey's military expenditure of 4.1 percent of gross domestic product (GDP) in the 1990s, its military burden in the 2000s came in at only

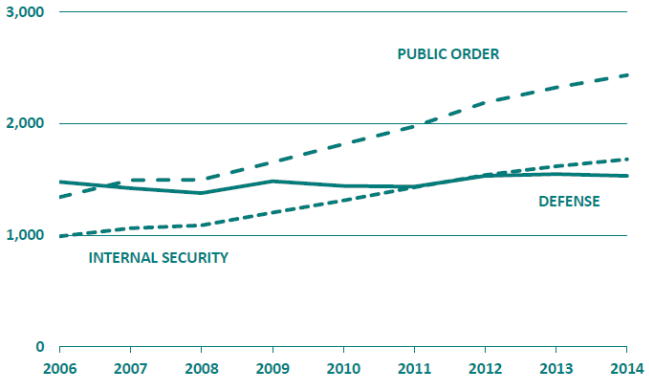

Figure 1: Budget expenditures on internal and external security, 2006–2014 (millions of TRY in constant 1998 prices). *Source*: http://www.bumko.gov.tr/TR,165/merkezi-yonetim-butce-giderleri-2006-2014.html.

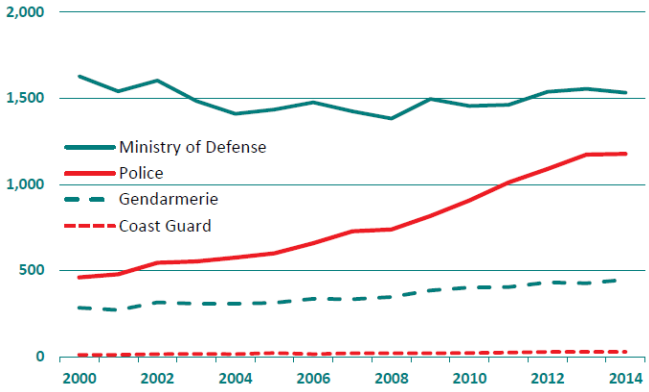

Figure 2: Budgets of security services, 2000-2014 (millions of TRY in constant 1998 prices). *Source*: http://www.bumko.gov.tr/TR,5740/2014.html.

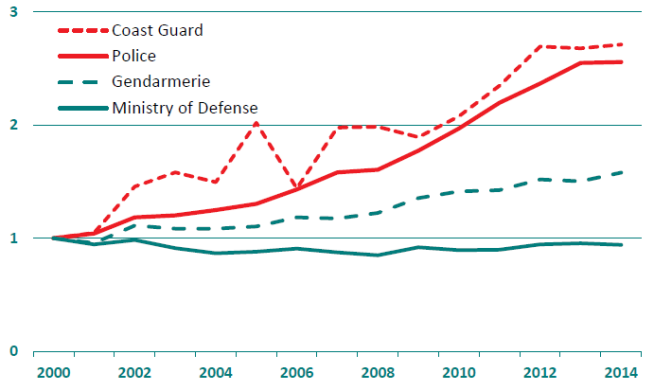

Figure 3: Indexed budgets of security services, 2000-2014 (2000=1). Computed from Figure 2.

around 2.2–2.5 percent. Whatever its military spending growth, it lagged significantly behind the economy's growth rate, hence the lower burden as a percentage of GDP. Still, security expenditure goes beyond allocations to military forces alone, and the emerging dominance of civilian security institutions in Turkey in the 2000s must be accounted for as well. Thus, the first subsection hereunder reflects on Turkish preferences regarding its internal and external security policy design and their effects on resource allocation; the second looks at Turkish security on-budget and off-budget data.[21]

On-budget: Internal security versus external security?

The functional breakdown of Turkish budget data is available since 2006, in conformance with the European Union's classification. Figure 1 illustrates that spending on public order and safety increased fast—the growth rate for 2006–2014 is 81.4 percent—and especially so since 2008. Spending on external security, i.e., military expenditure, not only fell below that of public order expenditure but remained sluggish in real terms. The military budget grew by only 3.6 percent. This resulted in a falling share of the military budget in the overall budget (4.7 percent in 2014) and also in GDP (1.2 percent in 2014). Although not wholly unexpected, what is intriguing is the seemingly drastic 69.7 percent growth of internal security spending, now larger than then the country's military budget.[22]

Extending the analysis back to 2000 will serve a broader understanding of the resource allocation patterns for security. Due to lack of data availability, this is possible only if we focus on the agents providing security services. The defense ministry budget and external (military) security link is self-defined. The police force, the gendarmerie, and the coast guard are the other leading agents, expenditures for which are classified almost in their entirety under the internal security rubric of public order and safety, even as the latter two do in fact have dual security mandates. Affiliated with both the interior and defense ministries, the proportion of their internal to external duties is, however, unclear so that the data cannot be adjusted. But in conformity with EU budget norms, and in contrast to the past, the gendarmerie and the coast guard no longer are classified under external security (military) expenditure.[23]

Figure 2 illustrates the relative positions of these security service bodies (in inflation-adjusted terms). As would be expected, the military budget is dominating. What is unexpected is that this budget is stagnant over the whole of the 15 years covered, more so given the preceding discussion in this article on the reoriented perception, role, and nature of Turkey's external security threats. The significant rise in budget allocation for police services is a novel component in Turkey's security fund allocation. As discussed elsewhere,

Figure 4: DISF income and expenditure, 2000–2014 (in constant 2009 USD millions). *Source*: http://www.ssm.gov.tr/anasayfa/kurumsal/Faaliyet%20Raporlar/2013%20Y%C4%B1l%C4%B1%20Faaliyet%20Raporu.pdf.

legislative transformations with regard to mandates and accompanying staffing policy are the main underlying factors for this. Note that the gap between the military and police budgets has narrowed significantly from 2000 to 2014. The budget of the gendarmerie ranks third over the same period, while the coast guard budget appears to be relatively small.[24]

Security perceptions and policy priorities might be better reflected by indexation of the relevant budgets. Thus, Figure 3 shows that the military budget has not grown at all. In contrast, while relatively small in magnitude, the budget for the gendarmerie grew by over 50 percent and those of the coast guard and police by more than 150 percent. These increases coincide with the securitization of domestic politics as well as with pressures on border security, especially coastal security in the Mediterranean and Aegean. Mainly, but not solely, due to asylum-seeking triggered by the unrest in Iraq and Syria, the work loads of the near-shore gendarmerie and of the coast guard has increased significantly.

All together, internal and external security spending has had a stable budget share of around10–12 percent in the 2000s; only its composition has changed. The budget data analysis seems to belie security priorities set by the AKP over the last decade: Even as the spoken emphasis was placed on external security, the practical, financial emphasis favored internal security—at least as far as the on-budget resource allocation is concerned. This invites a closer look, then, at the off-budget resource allocation for security, both internal and external.

Off-budget: Internal security cum external security?

For the past three decades, Turkish arms modernization has been administered by the Undersecretariat for Defense Industries within the Ministry of National Defense.[25] The ambition of national arms self-sufficiency mentioned at the start of this article has been realized to some extent—54 percent, in 2015, as reported by the Undersecretariat which monitors domestic and joint arms production and arms imports. As of 2015, of the total value of the contracts, 49 percent is joint production with leading international arms producers, 8 percent is international consortium work, 9 percent is imports and 30 percent is R&D. Turkey's arms exports (products of domestic and joint ventures) have become more significant over time, now falling between Norway and South Africa. Major buyers are the United Arab Emirates, Saudi Arabia, and Pakistan. The leading arms supplier to Turkey is the United States (58 percent), followed by Spain. The Undersecretariat commands an off-budget facility, called the Defense Industry Support Fund (DISF) which has facilitated time-saving—and public auditing-exempt—off-the-shelf purchasing of armaments for three decades, notwithstanding the promotion of the upgrading of domestic production.[26]

Figure 4 illustrates the scales of off-budget income and expenditure of the Fund, excluding transfers from on-budget resources (especially from the defense and finance ministries). Expenditures have about doubled, in constant dollars, since 2006. (The fluctuation in expenditure is normal, depending on the project stages.) Due to irregular timing of the income streams, the income sources—tax shares, transfers from the budgets of the finance and defense ministries, treasury contributions, and revenues from tangible and intangible assets—might not overlap with expenditures, a fact mentioned only in passing in the reports of the Undersecretariat.

At inception, the function of the DISF fund was limited to the modernization of the army; today, with legislation amended in 2011 and 2014, the facility extends to police and national intelligence as well, implying a consolidation of procurement for internal and external security. Expenditure out of the DISF is estimated to range between 10 and 14 percent of the military budget in the 2000s and at least one-third of military equipment spending is provided by the DISF. (In passing, it should be noted that data transmission and transparency by the DISF has significantly deteriorated over the past decade as compared to the 1990s and early 2000s. The composition of procurement expenditure, e.g., for imports, for internal and external security is undisclosed.)[27]

In a word, the data suggest that Turkey is moving fast toward capacity-building in defense, facilitated mainly by the DISF. Concurrently, funding for internal security is gaining pace. Overall resource allocation is aligned with internal and external security perceptions which are becoming increasingly complementary.

New alliance partners

Apart from the drastic growth of internal security spending and capacity building in the defense sector, Turkey also developed *ad hoc* alliances to break its growing isolation in the region. Although they may not turn out to be sufficiently powerful to create solutions sought by Turkey vis à vis the Syrian conflict, they still are expected to block or slow down developments assumed to harm Turkey's security interests. One dimension of this involves the restoration of ties between Turkey and Israel, damaged after an acrimonious split in 2010 when Israeli commandos raided a Turkish ship carrying supplies to Gaza, killing 10 Turkish activists.

Another dimension includes Turkey's desire to pursue deeper cooperation with Saudi Arabia and Qatar. During President Erdogan's visit to Saudi Arabia in December 2015, a strategic cooperation agreement was signed, covering military, economic, and investment aspects and intended specifically to foster cooperation among 34 Muslim countries against terrorism. Turkey is also building a military base in Qatar which expressed its "full solidarity" with Turkey as it seeks to protect its own borders and preservation of its security and stability. Relatedly, Qatar strongly distanced itself from an Arab League resolution condemning Turkey's bombing of PKK targets in northern Iraq in August 2015. All of these engagements offer certain economic opportunities to Turkey, too.[28]

Conclusion

The Turkish case tests the proposition that the advantages of economic exchange can pave the way toward conflict resolution regarding territorial problems in the absence of a political climate that favors negotiation and peace building. As regards Greece, Armenia, and the KRG, economic interactions did contribute to the freezing of disagreements but were not sufficient for their resolution.

The case also offers some general lessons. Although the actuality or perception of threat in international relations is often equated to military capabilities, understanding the meaning of threat necessitates an analysis of the central role played by identity. In this regard, the Turkish experience shows that state preferences in favor of economic means as a vehicle of conflict resolution is not just an automatic outcome of a state's adoption of a liberal economic vision. Rather, an application of this vision, as seen in Turkey's effort to transform its border with Syria to a "meaningless" entity, also involves a change in perceptions. The Turkish government's shared sense of identity decreased its threat perception and thus increased its willingness to cooperate, an outcome that is in line with arguments made by social constructivists and social identity theorists. In contrast, the liberal peace hypothesis rests upon the presumption of similarity of regimes and their capacities to build common institutions. Turkey's experience with Syria would seem to undermine the latter hypothesis. Moreover, it is interesting to note that in the Turkish case, change in perceptions of identity and security did not only encourage economic and diplomatic means of resolution but also prepared the ground for Turkey's involvement in Syrian affairs.

While threats to Turkey's security seem to have multiplied in a fashion making internal and external security inseparable, these challenges entwined with budgetary decisions. On-budget components for internal security have grown at a rapid pace and now exceed the external (military) budget. Supplementary evidence comes from the availability of off-budget financing to procure equipment for both military and, since 2011, police and intelligence services. However, without the backing of regional allies, Turkey's own efforts to enhance its security would seem insufficient as the potential break-up of Iraq and Syria would likely produce new territorial disputes, including struggles to define new international borders.

Notes

The authors thank Jurgen Brauer for critical comments which helped to improve the text significantly.

1. Territory triggers crisis: Huth and Allee (2002) find that 348 territorial conflicts from 1919 to 1995 are linked to 374 militarized disputes and 40 interstate wars. Mobilize domestic support: Agnew and Corbridge (1995); Kliot and Newman (2000). Liberal peace scholars: Rosecrance (1999).

2. Ex-ambassador: Elekdag (1994).

3. New foreign policy approach: Dagi (2009). Energy corridor: Barkey (2011).

4. New vocabulary and terms: Aras (2009). Soft-power assets: Oguzlu (2007). Interdependence and mediation: Altunışık (2008); Ayman (2011). Annan Plan: Oktay and Kınacioglu (2007). Greece: From 2000 to 2013, more than 100 bilateral agreements were signed and led to flourishing trade between the two countries. Reciprocal foreign direct investments of Greek and Turkish companies, bilateral tourism, and cooperation in cultural and scientific fields all increased, and railroads connecting the two countries have been improved. In addition, a Council of Strategic Cooperation was established in which both prime ministers meet annually and joint ventures were undertaken for the construction of the Interconnector Turkey–Greece–Italy (ITGI) natural gas pipeline. Growing bilateral trade: Onis and Yılmaz (2008). Armenia: Goshgarian (2005).

5. Disappointed: Oguzlu (2008). Unresolved: The only exception concerned the adoption of confidence building measures, since 2000, aimed at reducing tension emanating

from conflicts over Cyprus and the Aegean Sea. Talks took place under the auspices of NATO and between the political directors of the respective foreign ministries. However, the measures agreed to so far are largely targeted at crisis management, not resolution of the issues at hand. Cyprus offshore fields: Andoura and Koranyi (2014).

6. Ozkan (2010).

7. Quote: Kiniklioglu (2009).

8. Hydrocarbon-rich countries: Biresselioglu (2011).

9. Economic relations and trade: In 2002, the European Union's share of total exports from Turkey was 56.5 percent. This figure fell to 46.3 percent in 2010. Africa's share, including some Muslim North African countries, was 4.7 percent in 2002, and it rose to 8.2 percent in 2010. Also, Middle Eastern countries' share rose from 9.6 percent in 2002 to 20.3 percent. According to Turkish Statistics Institute data, the countries that increased the amount of goods purchased from Turkey in 2010 compared to 2008 included Egypt (83.6 percent), Libya (67.5 percent), Iraq (30.8 percent), Syria (27.8 percent), Algeria (10.4 percent), Senegal (6 percent), and Pakistan (5.2 percent). Trading state: Kirisci (2009).

10. In 1939, the French government ceded Syria's Hatay (Alexandretta) province to Turkey, in essence an annexation, in order to assure Ankara's signing of a nonaggression pact and hoping that Turkey would join England and France against Nazi Germany in the second world war. This met with heavy protests in Syria, then still struggling for independence from France. Although the French decision was accepted in practice as a necessary concession to secure Syrian independence, afterward the country staunchly refused to recognize the border that now separated Hatay from Syria. Official Syrian maps continued to include Hatay as part of the country's national territory. See Tur (2016, pp. 112-118).

11. Turkish–Syrian free trade agreement: Akinci (2004). Also see Syria (2009), Turkiye-Suriye (2010), and Enginsoy (2010).

12. Dombey (2011).

13. Quote: AKP (2011).

14. For the challenges of the refugee crisis see Kirisci (2014, pp. 18-38). Greek accusation: See DW (2016).

15. New approach to border security: Yesiltas (2013). Border personnel: TDN (2015).

16. For an interview with Turkish Deputy Prime Minister Numan Kurtulmus on this subject see DS (2016).

17. For a listing of recent PKK attacks in Turkey, see Guardian (2016). For a similar list of ISIS attacks, see Yourish, *et al*. (2016).

18. Hurriyet (2015).

19. Missile defense capabilities: Egeli (2013).

20. Russian missiles in Armenia: Kasapoglu (2014).

21. Military resources: SIPRI (2015, p. 352). The military expenditure data referred to here includes the military budget and other resources allocated to the military (SIPRI, 2015, p. 400). In the Turkish case, this number exceeds the national military budget by 30–40 percent in the 2000s. Arms imports: SIPRI (2015, pp. 417-418, 420). Military burden: SIPRI (2015, p. 394). Civilian security institutions: Gunluk-Senesen and Kirik (2016).

22. Public order and safety expenditure comprises the following categories: Police services, fire protection services, law courts, prisons, R&D related to public order and safety, and expenditure not elsewhere classified. For defense, the categories are: Military and civil defense, foreign military aid, and R&D related to defense. See EC (undated). Budget data, as used in the main text, comes from Turkey's Ministry of Finance. The GDP deflator, derived from TurkStat, is used to convert the data into constant prices.

23. Inseparable: Gunluk-Senesen and Kirik (2016). Although there are additional items in the public order and safety category, raising mostly unexplored issues with regard to their contribution to overall safety and security, we restrict our analysis here to the items listed in the main text. In contrast to the past: See, e.g., Gunluk-Senesen (2002).

24. Elsewhere: See Gunluk-Senesen and Kirik (2016).

25. For more information on the activities of the Undersecretariat, see http://www.ssm.gov.tr/home/Sayfalar/default.aspx. Financial data is compiled from various annual reports of the Secretariat, e.g. Savunma Sanayii Mustesarligi Faaliyet Raporu (2015). There are irregularities, especially very recently, in bout currency units, USD and TRY. We stick to the available series in USD, published earlier. See http://www.ssm.gov.tr/anasayfa/kurumsal/Faaliyet%20Raporlar/2015%20Y%C4%B1l%C4%B1%20Faaliyet%20Raporu.pdf [accessed 20 March 2016].

26. Major buyers: SIPRI (2015, p. 407). Major suppliers: SIPRI (2015, p. 420).

27. At inception: Gunluk-Senesen (1993). Consolidation: Gunluk-Senesen and Kirik (2016). DISF: Kirik and Gunluk-Senesen (2012).

28. Turkey–Israel: Reuters (2016). Turkey–Saudi Arabia: Barchard (2016). Turkey–Qatar: Cafiero and Wagner (2015).

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