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The Conflict Trap in the Greek Civil War 1946-1949: An economic approach

Nicos Christodoulakis

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The Conflict Trap in the Greek Civil War 1946-1949: An economic approach

Nicos Christodoulakis [#]

ABSTRACT

The paper provides a quantitative analysis of the armed confrontation that took place in Greece between the Communist Party and the Centre-Right Government during 1946-1949. Using monthly data for battle casualties a dynamic Lotka-Volterra framework is estimated, pointing to the existence of a conflict trap that explains the prolongation of the civil war and its dire consequences for the country. To examine the extent to which the confrontation was influenced by socio-economic factors, a regional analysis finds that political discontent was mainly correlated with pre-war grievances rather than class-structure, while the mobilization of guerilla forces was crucially affected by morphology and the local persecutions by the Government. The economic cost of the conflict is estimated to be close to an annual GDP, and its effect to last for at least a decade, in line with similar findings in contemporary civil wars. The failure to prevent the conflict or stop its escalation is discussed together with some conclusions for the long term repercussions and the current social discontent in Greece.

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[#] Athens University of Economics and Business, Patission 76, Athens Greece
Hellenic Observatory, London School of Economics

The Conflict Trap in the Greek Civil War 1946-1949: An economic approach

1. Introduction

The Greek Civil War (GCW) that took place in 1946-1949 between the Communist Party (KKE) and a coalition Government of centre and rightwing parties had lasting and dramatic consequences for the country in general and the economy in particular. The human carnage exceeded the number of battle-deaths during the Italian and German invasions in 1940-41, and was followed by massive expatriation of defeated guerillas and their families. Persecutions and political segregation lasted for a quarter century, making Greece a hotbed of authoritarianism that culminated in a brutal dictatorship before a liberal democracy was finally restored in 1974.

Amid many questions that are still pending on why and how the civil war erupted, there is a central paradox regarding the intensity and perseverance of the conflict. Ex post, it seems obvious that a termination of hostilities could have been proven beneficial for both sides, especially if one takes into account that the country had just exited another catastrophic war and prospects were naturally being expected to improve and provide more opportunities for all. But instead of opting for a constitutional power sharing as happened under similar confrontational circumstances in Belgium in 1944 and in Italy in 1946,

the adversaries in Greece got engaged in a prolonged conflict with enormous consequences in human, economic and political terms.

In the first place, the Greek National Army (GNA) seemed to be vastly superior in size and equipment and this was making it to be unwinnable by the guerillas. But this was not necessarily translated to a clear advantage in the mountainous battlefields where the fighters of the Democratic Army of Greece (DAG) proved to be undefeatable. Thus, a 'conflict trap' emerged, whereby the effort of one side to win was matched by the opponent's response which, nevertheless, was not sufficient to redraw the balance and led to the perpetuation of hostilities. It was this combination of GNA unwinnability and DAG undefeatedness that made the conflict and its costs to escalate beyond any imaginable level and handicapped the prospects of the country for more than a generation.

Though there are plenty of contributions on the political and ideological issues pertaining GCW as well as vast anecdotal evidence on battleground episodes, a systematic analysis of the socioeconomic causes and consequences of the conflict trap is still lacking. One reason is certainly political: for nearly three decades the only available view was that of the winners, until it was reversed by the wave of left-wing interpretations that prevailed after 1974. It was only during the last two decades that key historical episodes have been scrutinized and a more balanced approach was adopted; see, for example, the collections by Baerentzen et al (1987), Iatrides and Wrigley (1995), Koutsoukis and Sakkas (1996), Nikolakopoulos et al (2002), among many others.

Another reason was the inadequacy of existing data series on socioeconomic and military developments, due both to the official secrecy surrounding the conduct of the war as well as the fateful decision of the Greek Government in 1989 to massively destroy historical archives related to the Civil War[1]. Some quantitative evidence on GCW can be found in Margaritis (2000) where military and economic aspects of the conflict are described though not in a formal framework, while Marantzidis (2010) provides extensive information on the logistics of the guerilla army. A path-breaking exception was the field research conducted by Kalyvas (2006) that led to the reconstruction of conflict data series and enabled a formal analysis on the origins and mechanisms of violence in GCW. This, however, covers only one prefecture of Greece thus aggregate or regional-wide comparisons cannot be undertaken.

The scarcity of quantitative analysis is even more pronounced if one takes into account the prolific literature on the dynamics and the economic aspects of civil wars worldwide, the research on which includes both theoretical advances on conflict modeling as well as a rich methodology for assessing their consequences, as is briefly reviewed in the next Section. Motivated by these findings – and challenges – of contemporary literature, the present paper aims to explore the following issues pertaining to the Greek Civil War:

First, it aims to estimate the dynamics of GCW and investigate the existence and stability of a conflict trap. A statistical analysis of battle data series shows that the conflict should be examined into two phases; one with relatively low-scale operations spanning the period 1946-1947

[1] The Herostratian decision was taken on the naïve expectation that national reconciliation is achieved not by studying and understanding history but by eliminating its records.

and the other with major-scale conflicts that took place in 1948-49. A modified version of the dynamic Lotka-Voltera model is estimated for each period, and stable non-trivial equilibria are numerically calculated and compared with actual developments in the battle-field. Moreover, the regional aspects of the conflict are examined to see how they were influenced by geographical morphology and local grievances, old and current.

Second, it aims to assess the costs incurred in the Greek economy as a result of the vast destruction of human and material resources during the conflict and compare it with other findings in modern civil wars. One method is by estimating potential GDP of Greece in the absence of GCW and then juxtaposing it with actual output to obtain a measure of output foregone. Alternatively, by employing neoclassical growth accounting one can measure the destruction on labor, industries and the livestock, and obtain an estimate of the fall on economic activity due to the conflict. Results by the two methods are then compared with similar estimates on other civil wars.

Third, to discuss the perpetuation of conflict as a political and institutional failure due to the confusion of tactics and the lack of institutional credibility on power-sharing as suggested by modern game-theoretic advances on the analysis of prolonged confrontations.

The above objectives demand coherent data series and, to overcome their inadequacy or unavailability, I decided to *"dig in the sources of events'*. New data series on battle casualties and persecutions covering the whole period 1946-1949 at a monthly frequency were compiled by systematically recording detailed – though usually scattered - evidence

that can be found in Greek military reviews, US military archives and various reports recently published by KKE. As no official census took place in the 1940s, several socioeconomic indices were proxied by regional data retrieved from the Statistical Surveys conducted in the nearest possible occasion either in the late 1930s or in 1951.

The rest of the paper is organized as follows: Section 2 briefly reviews the conflict literature, Section 3 provides a statistical analysis of the Greek battle data, and Section 4 presents an econometric estimation of the conflict traps. Section 5 describes the regional aspects of the conflict and Section 6 assesses the economic cost incurred to Greece by employing econometric or production function techniques. Section 7 attempts to explain the prolongation of the conflict in terms of policy failures and, finally, Section 8 draws some conclusions and lessons that might be relevant to the current political situation in Greece. The paper has three supplements: Appendix A describes the theoretical properties of the conflict model; Appendix B includes the estimates of the economic cost, while in Appendix C the data series are defined and sourced.

2. A brief review of the literature

The state of the art on analyzing civil conflicts is emphasized from different perspectives by several authors: Regarding the causes of civil wars, the theories of grievances and rational greed are examined here as alternative explanations. According to Collier and Hoeffler (2001), an individual participates in an insurgence if expected gains outweigh the costs of engagement plus benefits foregone by abandoning current

activities. Grievances thrive with poverty and political exclusion but remain short of spurring a civil war, unless the opportunity cost of rebellion is reduced due to weak enforcement institutions and ineffective repression. In the same line, Fearon and Laitin (2003) argue that violence is escalated when repression is poorly enforced, thus reducing costs and increasing expected payoffs for insurgents. The greed theory however may be at odds in explaining costly conflicts that seriously damage both adversaries irrespective of the outcome, as proved to be the case of GCW.

In an authoritative review, Sambanis (2002) criticizes the opportunity-cost model by arguing that the escalation of repression leads to larger-scale hostilities rather than suppressing them. Instead, democratic institutions may prove efficient in alleviating grievances and thus prevent bloodletting. Similarly, Blattman and Miguel (2009) inquire various root-causes theories and conclude that slow economic growth and favorable geographic conditions are found to be robustly linked to civil wars. Grievance theory is not new and in fact has been adopted by several rebel leaders[2] in their advocacy of conflict when all other means have failed (or claimed to be so).

As noted by Lu and Thies (2011), grievance precedes opportunity and denotes just a motivation to rebel that may be activated only if the opportunity cost to fight becomes very low whenever economic conditions deteriorate or exclusion politics dominate. Also Bruckner and Ciccone (2007) find that low income growth increases the likelihood of a

2 In the same line, Lenin (1929, p289) asserted that 'the oppressed masses never won in a struggle involving losses of life, unless they were previously put in a state of despair due to long lasting hardships and acute crises', though not for alleviating but rather seeking such a terminal situation.

civil war in autocratic regimes, though democracies are more likely to undertake pre-emptive action and attenuate the threat. As pointed by Regan and Norton (2005), grievance is not automatically transformed into rebellion unless party elites are capable of collective mobilization and of ensuring protection for those participating. Besley and Persson (2008) have shown that more consensual political institutions reduce the incidence of conflict as distribution of more public goods shrinks the value of unilateral appropriation by the party in power.

Regarding the economic legacy of the civil conflict, neoclassical growth theory is usually employed to identify how the destruction of factors of production affects growth. The growth-inflicting list may also include the disruption of markets, curtailment of trade and foreign investment, and the deterioration of productive infrastructure caused either by destruction or under-financing as Government resources increasingly go for military procurement; see for example Murdoch and Sandler (2004). On the same topic, Collier and Hoeffler (2007) estimated that a civil war incurs a loss totaling between 90% and 105% of a year's GDP.

Another strand of literature attributes the occurrence and duration of civil wars to incomplete and asymmetric information that distorts the payoffs expected to be won by the adversaries; In a recent contribution Acemoglou and Wolitzky (2013) argue that incomplete information about rival's intentions may lead one side to interpret noisy signals as pretentious tactics of the other in order to gain advantage and opts to respond in a similar manner. The outcome is that each side maximizes its own aggression leading to 'conflict spirals'.

Another cause of prolonged conflicts is the failure to negotiate effectively, either because there is uncertainty about ulterior motives or simply because agreements lack an enforcement technology. In Cunningham (2013) negotiations by proxy may fail because “in many cases mediators and others may have interests beyond just ending the fighting” and it may the case that “international actors are unwilling to intervene to the degree necessary to forcibly disarm veto players”. Uncertainties multiply in the absence of an undisputable leader, and it is well-known that the closer the electoral scores of the partners of a coalition, the more competitive they are with each other; for an analysis see Tsebelis (1998). Skarpedas (2008) argues that the ability to enforce negotiated contracts between competing groups is weakened by various factors ranging from geography and ethnicity to external intervention, and this makes the option of war to look more appealing for appropriating power, even when the cost of engagement is multiplied.

But even when leaderships truly seek a compromise, their efforts may be impeded by the accumulation of aggression exercised at a decentralized level. As analyzed by Kalyvas (2006, Ch. 9), the spreading of violence at a micro-level before and during the GCW proved to be a powerful fertilizer of the conflict as hardliners of both sides had all the excuses to interpret these actions as signals of mounting aggression by their opponent.

Regarding the modeling of conflict situations a large variety of approaches can be adopted. A comprehensive review of conflict modelling is given by Lichbach (1992) who groups more than two hundred scholarly contributions into two broad categories: those of the

rational choice optimizing framework, and the non-rational choice stochastic models. The first set is employed by the root-causes literature by testing – usually by cross country or regional panel data - the intensity of conflict against various explanatory variables. The second set studies the interaction dynamics by employing variants of Lotka-Volterra models that were originally devised to study species interactions. Such models were employed for studying the interactions generated by the class-struggle (e.g. Goodwin, 1967), the arms race (e.g. Richardson, 1960), political rivalry (e.g. Fransisco, 1996), riots (e.g. Burbeck et al, 1978) or outright revolution (e.g. Tsebelis and Sprague, 1989).

An extreme case of stochastic modelling is the literature on power-law distributions of conflict casualties; Clauset et al (2007) use a cross section of fatality data to show that they follow a Paretian distribution, while Bohorquez et al (2009) relates such distributions with other confrontational phenomena from ecology to finance and social dynamics. Though carefully warning that "common statistical distributions … in sociological data is not the same as understanding their origin", the authors nevertheless claim that their finding "establishes a quantitative *connection* between human insurgency, global terrorism and ecology, (my emphasis)", and even point to the similarity to financial market models. As noted by Lichbach (1992) this atheoretical approach amounts to claiming that conflicts occur randomly, in sharp contrast with the schools of thought that interpret them as outcomes of rational calculation or a response to grievances. If anything, such contrast underlines not just the vast possibilities open to the researcher but also the huge gap that still divides alternative approaches to analyzing and quantifying civil wars.

3. Conflict data and periodicity

The main developments in the Greek Civil War are described by examining monthly time series of battle-deaths and total battle-casualties[3] of both DAG and GNA during the period from January 1946 until December 1949 as shown in Fig. 1. Although the formal beginning of the GCW is in dispute, it is clear that casualties are small during the first half of 1946. For the present purposes the start of the civil war is considered to be the July 1946 when confrontation tactics were simultaneously adopted by the Government and the Communist Party. In response to widespread persecutions by rightwing militias, the latter had already started to organize 'self-defense' groups throughout Greece[4], and this prompted the former to set up emergency martial courts in several cities[5] to prosecute acts against "public order and safety". The formation of "Democratic Army of Greece" was formally announced in October 1946 and the conflict was ready to set off.

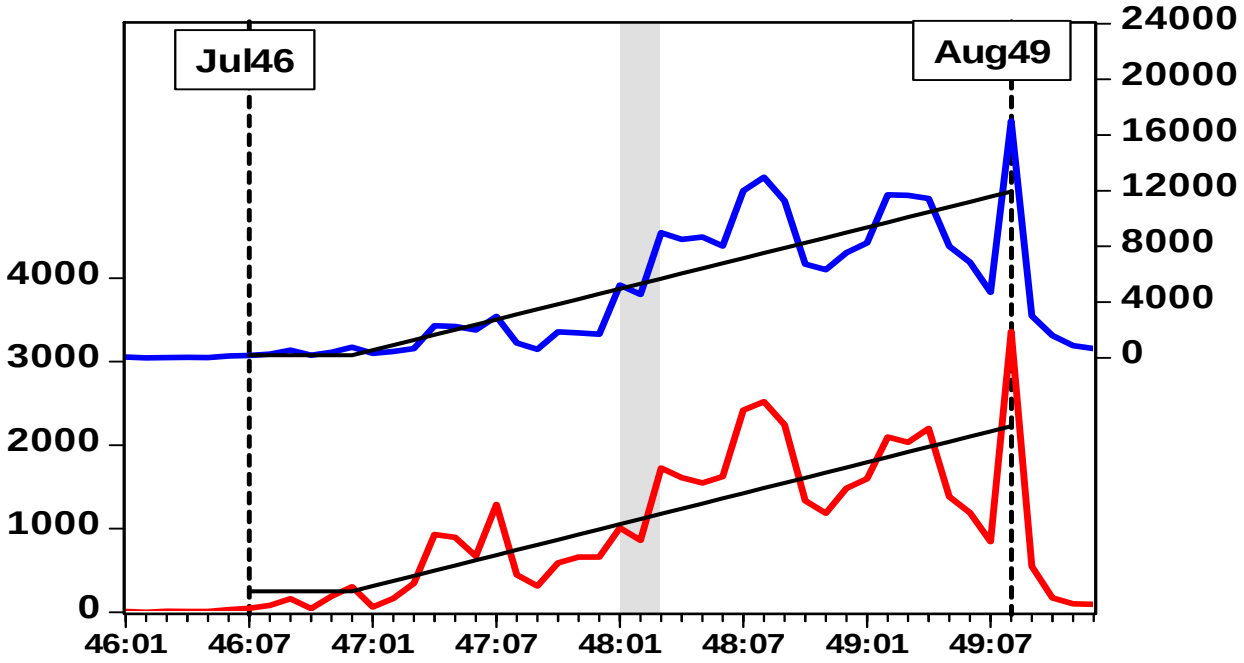
3.1 Statistical analysis

Main statistics are summarized in Table 1. The series of battle deaths and casualties are found to be non-stationary as the hypothesis of a unit root cannot be rejected for either series, reflecting the escalation of conflict. Losses rise sharply in the beginning of 1947 when DAG forces

3 Battle deaths and casualties include all people, combatant and civilian, that are killed or injured in armed engagements. According to Collier and Hoeffler (2007) this measure is more suitable to assess the human cost of a military confrontations.
4 The decision was taken in June 1945, by the 12th Plenary; see Rizospastis (2011, p149).
5 The Third Decree was issued in July 1946 and initially established 11 martial courts, but later they rose to 30.

attack several towns[6] and GNA launches the first wave of military operations[7] to clear their holdings in the mountains.

Fig.1 Total casualties (rhs) and battle deaths (lhs), monthly data 1946:01-1949:08



Note: The beginning of Civil War is marked on July 1946 and its end on August 1949. The shaded area in the first quarter of 1948 marks a structural break into two phases.
Source: Data as in Appendix C.

By the end of 1947, the conflict intensifies and acquires new operational and political characteristics. Employing a simple time-trend to remove non-stationarity, a structural break is detected at the beginning of 1948[8] and this leads to a sub-periodicity into two phases, the first spanning from July 1946 to December 1947 and the second from January 1948 to September 1949 when hostilities formally ended.

6 The most spectacular attack took place in Sparta where 176 political prisoners were set free (2/48) and Florina which was held under full DAG control for several hours (5/48); see Marantzidis (2010, p 192).
7 The main operations were 'Falcon-Ierax' and 'Stork-Pelargos' (4/47), 'Eagle-Aetos' (5/47), 'Swan-Kyknos' (6/47) and 'Crow-Korax' (5-8/47). Casualties are given by GES (1976) and GES (1980) as described in Appendix C.
8 The hypothesis of no breakpoint between January and March 1948 is rejected at a range of levels from 1% to 10% for total casualties and battle-deaths as shown in Table 1.

Comparing the statistics of the two phases a crucial change concerning the extent and nature of the conflict is revealed: The monthly average of battle-deaths quadruplets, while that of total casualties rises more than eightfold. The standard deviation as a ratio to the mean drops in Phase II to less than half the measure of Phase I, suggesting that the conflict is concentrated on larger-scale confrontations rather than the earlier pattern of widespread skirmishes.

Finally, the data are tested for the presence of power-law distributions. The complementary cumulative distribution function[9] (ccdf) is defined as the probability of a random variable *(X)* exceeding a level of total casualties *(x)*, and for a Pareto distribution is given as:

$$ccdf(x) = prob(X \geq x) = (x/b)^{-\lambda} \quad (1)$$

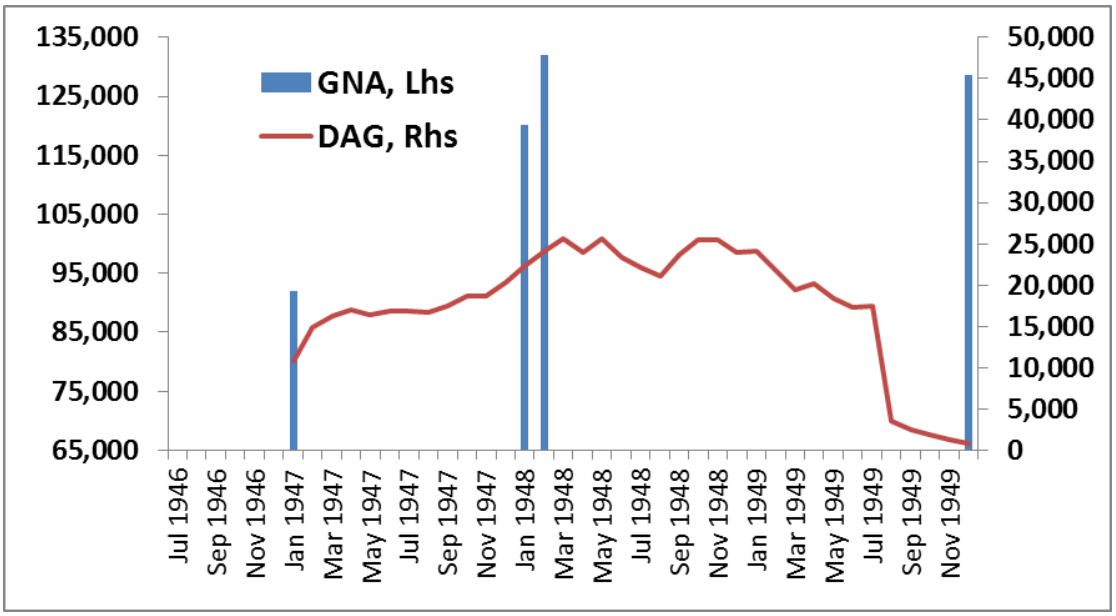
where *(λ)* is the conflict index and *(b)* a lower bound, i.e. *prob(X>)=1*. The higher the index the less likely a number of casualties will occur, implying repetitive patterns of conflict at a more or less stable scale. As shown in Table 1, the estimated index is found to be substantially lower than the 2.50 value predicted by the statistical models in Clauset et al (2007). A possible interpretation for the low value of *(λ)* in Phase I is the quick escalation of the conflict, implying from (1) that larger-scale events are more likely. In Phase II, the index is 1.55 for battle-deaths and 1.60 for total casualties, close to the estimates of 1.70 found by Bohorquez et al (2009) for the US and the Spanish civil wars. In any case, estimates are found to be sensitive to the sample selection, probably due to few observations available.

9 This is frequently called the 'survivor' function, but this is clearly unsuitable for battle deaths distributions.

3.2 Restructuring the GNA

The conflict escalation in the beginning of 1948 was preceded by extensive enlargement and operationalization of both armies as shown in Fig. 2. But though steadily increasing from 92,000 in the beginning of 1947 to 120,000 men by the end of the year, the Government army proved incapable to contain guerilla forces. Numerical supremacy of GNA was diminished in practice as many of its forces were allocated in non-combatant duties, while others were untrained and/or inadequately equipped for mountainous terrain; see Marantzidis (2010, p 92) and Averof (2010, p208). Gregoriadis (2011, p166) notes that the increase was a "nervous acceleration with the aim to be sent to the front the soonest possible". It was only after 1947 that these drawbacks were faced by acquiring modern arms and training by the US mission in Greece after the adoption of the 'Truman Doctrine' against the expansion of Soviet influence.

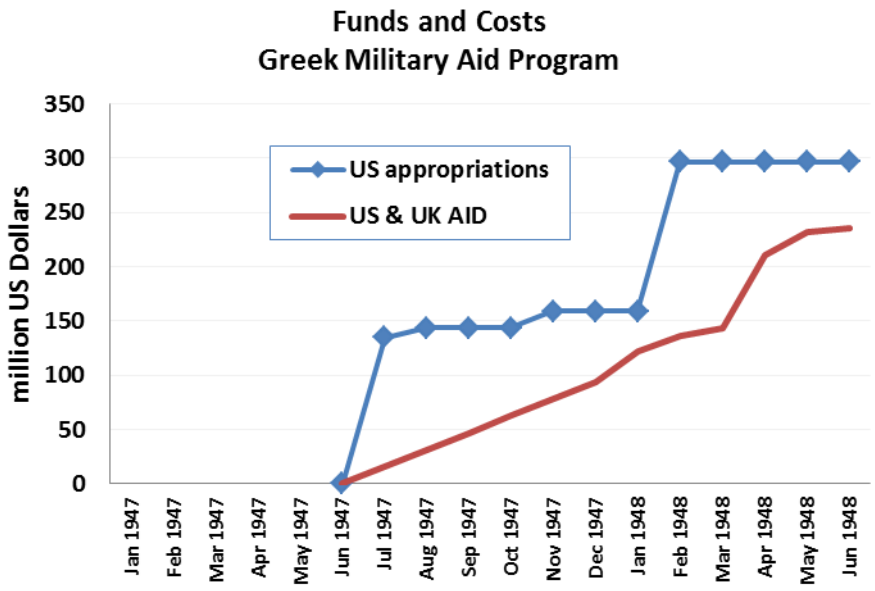
Fig.2 The size of the armies, January 1947-December 1949



Source: Data as in Appendix C.

GNA was further enlarged to 132,000, supplied by vast military shipments from the US (see Fig. 3), while combat training became more demanding, the army and non-combatant duties were delegated to the National Guard Battalions. At the same time, political cleansing intensified with left-leaning soldiers massively encamped in isolated islands[10], while hundreds of officers were court-martialed for alleged communist infiltration. Finally, a high US command arrived in Athens in February 1948 to coordinate army operations and this marked a radically new course in the civil war, both operationally and regarding the geopolitical repercussions on the ensuing Cold War.

Fig.3 The costs of military aid delivered to Greece for the GNA



Source: JUSMAGG 1949, Diagram Funds and Costs, Greek Military Aid Program, Gound and Air.

10 The most notorious was the camp of Macronisos where 28,800 soldiers and officers had been kept between 1947-1950. Though the Government hailed the camp as a 'moral transformation' institution, several of them perished as a result of torture and starvation; for a discussion see Kaltsogia-Tournaviti (2001, p 72)..

3.3 The Formation of DAG

Following a parallel – though more restrictive – process, DAG was trying to expand its force and improve logistics. Apart from training and backyard facilities offered by the neighboring Balkan states, substantial military equipment was shipped from Poland and other Eastern European countries to DAG in 1948-1949 in an effort to counter the improved capabilities of GNA; details are given in Marantzidis (2010, p 48-49). At the same time DAG was extensively restructured to cover all mainland and the islands[11] so that the conflict is spread all over the country. The monthly development of the guerilla army (DAG) is estimated as a function of battle deaths (RKLD) and net recruitments (NET) as follows:

$$DAG - DAG(-1) = \underset{1.50}{+1339} \underset{3.62}{-2.97}\, RKLD \underset{2.26}{+0.675}\, NET \underset{2.32}{+7.317}\, SMIA(-2) \qquad (2)$$

$$NET = RECR - RCAPT - RSURR$$

1947:02-1949:10, nobs=33, R2bar=0.419, DW=1.91, F-stat=8.70(p=0.0003)

The coefficient of nearly 3 on battle-deaths suggests that, besides those killed in the field, twice as many were also stepping aside after the fight. Given that the number of wounded was in average three times that of battle deaths, this implies that two out of three wounded were subsequently incapacitated of fighting; a high proportion confirming the claim that chronic shortages of medical facilities was one of the severest problems faced by DAG; see Rizospastis (2011, p302).

11 Details of the new structure in DAG are given by Kyritsis (2006, p 28).

New recruitments (NET) consist of voluntary or coerced participation or forcible of populations in the occupied areas (RECR), net of those captured (RCAPT) by, or surrendered (RSURR) to, GNA. The coefficient suggests that about two thirds were found suitable and the rest were either dismissed or, given the opportunity, deserting the front. Deserting was a two-way process. DAG seemed to be enlarged by GNA soldiers who were either captured in the field or fled the state army to join the guerillas. Numbers were probably underreported as missing in action (SMIA), though the estimated coefficient of more than 7 may be in excess of actual events.

From the above equation it is noticeable that on top of the above process around 1,339 in average were further recruited every month.

3.4 Political Developments

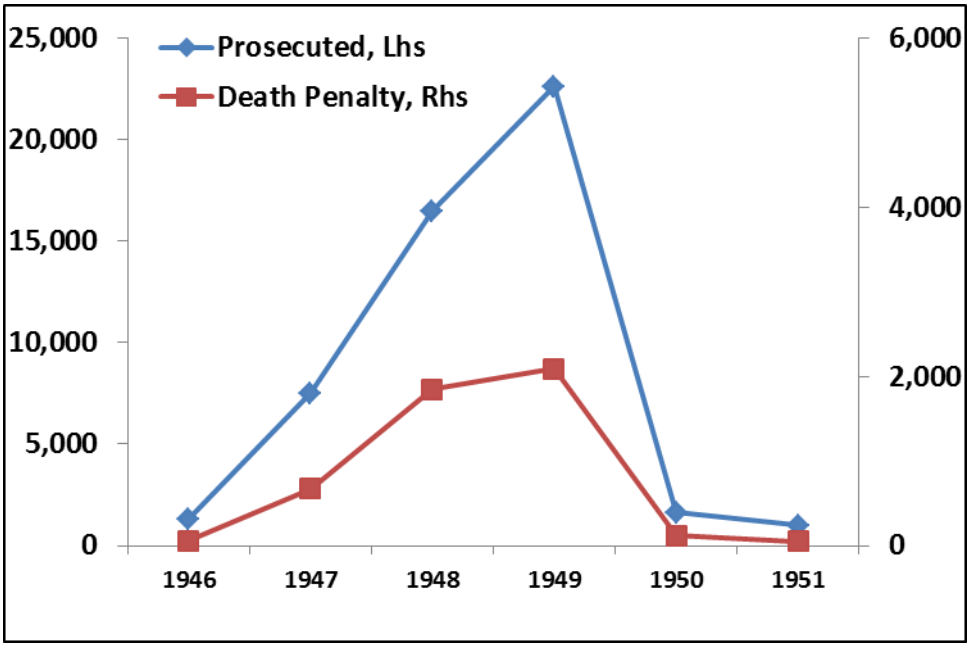
As armies were enlarged, military and political strategies became more ambitious for both the Government and the communists. The latter formed a 'Provisional Government' in December 1947 and launched their first tactical warfare operation to proclaim Konitsa –a town near the northern borders - as the capital of 'liberated' territories. After two weeks of intense fighting the operation was thwarted and the strategy of DAG was subsequently adjusted by concentrating on the war in the countryside[12].

Days after the battle was concluded, the Communist Party as well as all fellow organizations were outlawed and a massive purge of militants

12 Rizospastis (2011, p 290). The was the first open disagreement about strategy between the DAG leader supporting the partisan fighting and the Secretary General of KKE who insisted on the urban struggle.

swept the country.[13] Emergency martial courts were established in several more cities and procedures became swifter and stiffer; as a result prosecutions doubled in 1948 and death penalties increased threefold; see Fig. 4.

Fig. 4 Total prosecutions and death penalties in the emergency martial courts



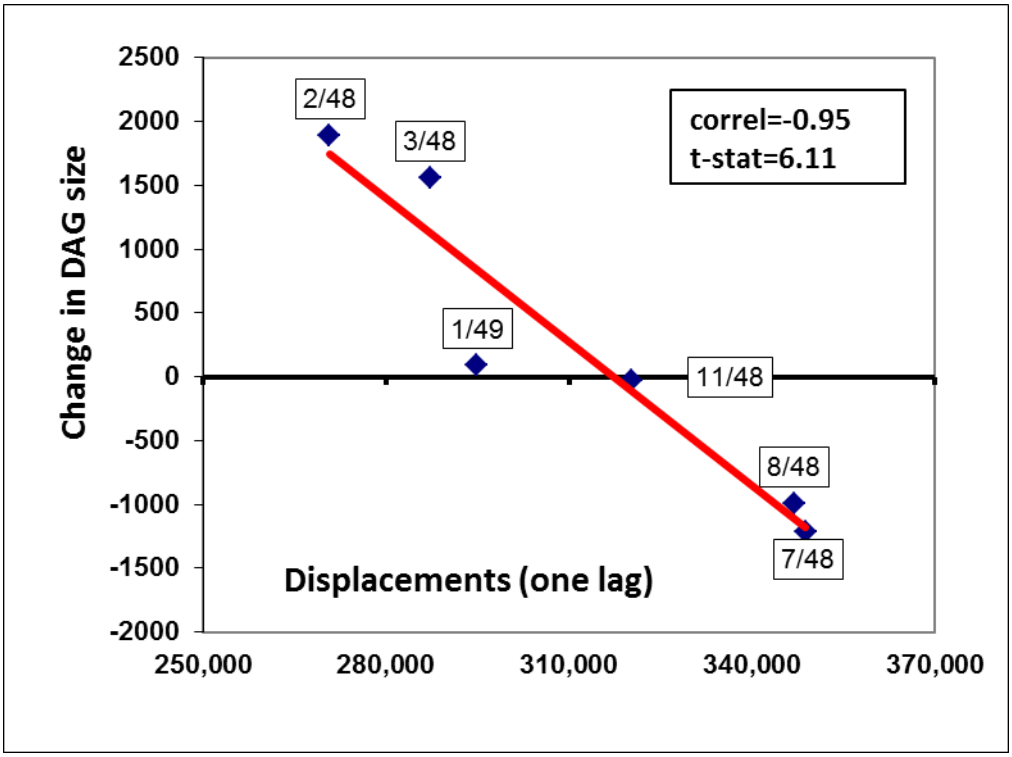
Source: Michiotis 2007, Tables 1 and 2, pp 235-236.

As the size of DAG continued to rise, more than 350,000 villagers were displaced from their land during 1948 and 1949 and transferred in refugee camps around the cities in Northern Greece. The Government presented the operation as protecting "bandit-stricken" villagers from being plundered, though KKE claimed[14] that it was a *'scorched earth'* policy aiming "… to undercut the provisioning system, the recruiting reserves and the intelligence system of DAG"; for a detailed account see Laiou (1987, p 61). Averof (2010, p 237) argues that in the beginning

13 For a description see Rizospastis (2011, p 292).
14 Rizospastis (2011, p 457).

villagers were voluntarily fleeing their homes to escape terror and the Government organized the operation to cut supply line only after 1948. Whatever the motivation, displacements hit DAG recruitments severely and this may be one of the reasons that its forces could not increase any further after 1948; Fig. 5 displays a strong negative correlation between displacements and increases in the DAG forces.

Fig.5 Monthly changes in the DAG force and aggregate displaments lagged one period



Source: Data as in Appendix C

These developments undermined the chances of a negotiated end to the conflict, and further fuelled hostilities. For example, the evacuees developed a strong opposition against DAG for being the reason they were taken away from their land and several of them volunteered to fight against guerillas. On the other hand, the wave of prosecutions created a potential pool for new recruits for DAG as would-be suspects

opted to flee to the mountains and thus avoid being court-martialed. In the beginning of 1948, it was clear that both the Government and the guerillas were opting for a prolonged and bloodthirsty confrontation as analyzed in the next Section.

4. Modeling the conflict trap

The dynamics of conflict between the army of rebels and the state army are expressed by the following difference equations:

$$\Delta R_t = [-\alpha + \beta S_t] \cdot R_{t-1} + \theta \tag{3a}$$

$$\Delta S_t = [-\gamma + \delta R_t] \cdot S_{t-1} + \varphi \tag{3b}$$

Variables R_t and S_t denote battle-casualties occurring at time (t) in the armies of rebels and state respectively, while Δ is first-differencing. Parameters represent the operational characteristics of the conflict. If assumed positive, parameters *(α,γ)* express the "self-protection" rates as each army learns over time how to survive and reduce fatalities by better training and defense-building. The "striking capability" of each side is assumed to be proportional to its own casualties suffered in the battle scaled by the parameters *(β, δ)*. Finally, *(ϑ, φ)* represent exogenous fatality shocks for the state and rebels' armies respectively. The above model differs from other Lotka-Volterra formulations of conflict in three important aspects:

First, it allows for contemporaneous interactions between the two armies as happens in the actual battle process rather than making the

unrealistic assumption that an army's current casualties are determined by the opponent's losses in the past.

Second, it allows for exogenous disturbances to influence the path of events and – if permanent – the size and nature of the steady-state. Some models (e.g. Francisco, 2009) unrealistically assume that a prolonged conflict has only autonomous dynamics and remains immune from the external environment. This may be happen in biological experiments *in vitro*, but hardly is a case for actual wars. Exogenous shocks in the number of casualties may stem, if positive, from superior new technology acquired by its opponent or, if negative, from an improvement in its own survivability. The autonomous conflict is obtained as a special case by letting $\vartheta=\varphi=0$.

The third point is technical, but with crucial implications for the existence of non-trivial conflict equilibria. In both the standard discrete-time framework with lagged interactions or the continuous-time system with current time terms, a limit cycle is obtained only if parameters (α,γ) are of opposite sign, a situation that as noted by Zhang et al (2007) corresponds to predator-prey populations. But to assume that guerillas (or the state) are prepared to act as preys and still enter in a civil war is outright irrational, and – in fact - it is more likely that a conflict turns to be prolonged if the two sides adopt similar rather than diverging fighting patterns[15]. This asks for both parameters being negative and leads to a competitive behavior that is more suitable for modeling organized civil

[15] Pointedly, Clausewitz's (1976, p480) advise was that a guerilla war should not be conceived as an isolated process but 'in the framework of a war conducted by the regular army'.

strife[16]. The solution of the model is described in Appendix A along with parameter conditions for the existence of non-zero equilibrium.

4.1 Estimation

The model (3a, 3b) is separately estimated for the two phases of civil war outlined in Section 3: the first covering the period from when the civil conflict started in July 1946 to December 1947 and the second from January 1948 to September 1949 when concluded with the defeat of DAG. Estimations for battle-deaths[17] are displayed in Table 2 and all coefficients found to be statistically significant and correctly signed.

The main conclusions per phase of conflict are the following:

(i). Survivability parameters (α,γ) are found to be nearly equal for both armies in Phase I. As losses for GNA include Gendarmerie and poorly-trained local militias, results suggest that vulnerability of state troops was not any better than that of the insurgents. The balance shifts only in Phase II, during which self-protection hardly improves for DAG but rises by 47% for GNA due to the increasing professionalization of the state army and the fact that all other forces were placed under its operational command.

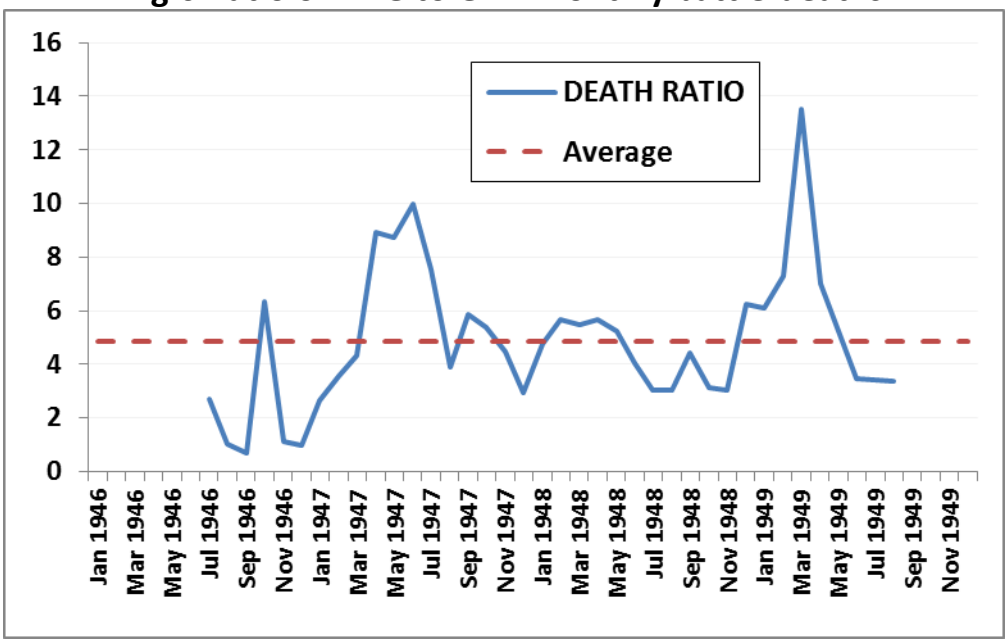
(ii). The striking capabilities decline in Phase II as both armies get better organized and conflicts now involve larger-scale battles rather than skirmishes. Crucially, GNA capability (β) remains superior to that of DAG (δ) in both phases of the war. Fatality parameters (ϑ, φ) rise substantially

[16] If both are positive, they correspond to the "symbiotic pattern" where each population supports the other in a mutually beneficial way. But this is, of course, alien to determined adversaries.
[17] Estimation was also carried out for battle casualties and results are similar to those reported for deaths. This is somehow embedded in the data as the figures for DAG wounded in 1948-1949 were approximately set by the Government to be three times that of deaths; estimation details are available by the author.

for both sides, though especially so for DAG. It is noticeable, however, that the *relative* capability of GNA versus DAG *(*i.e. the ratio *β/δ)* falls substantially in Phase II from around sevenfold to twofold. This suggests that the improvement in fighting acquired by DAG in the second period outperformed the improvement of GNA, though still remaining inferior in absolute terms.

In Phase I the state army was employed in containing guerilla forces by basically defensive operations[18] in the hope that they eventually give up by exhaustion. Even when major operations were undertaken by GNA in 1948 and 1949 guerillas still managed to keep key strongholds and continued to cause severe losses in the state army. It is noticeable that as a result the battle-death ratio of DAG to GNA remained close to the average for most of the time as shown in Fig. 6.

Fig.6 Ratio of DAG to GNA monthly battle-deaths



Source: Data as defined in Appendix C

[18] This looked as the situation described by Clausewitz (1976, p596) as pregnant with disaster. This arises when the army is 'taking things the easy way – using superior force to filch some provinces, preferring the security of the minor conquest to a major success'.

4.2 Conflict Equilibria

These developments still meant that GNA was impossible to be won by DAG, but at the same time they continued to be far from securing a quick victory over it, thus leading to a prolonged conflict trap. Guerillas were severed by inadequate replenishment, poor training and the inoperability of equipment, but they were still mastering low-scale and mountainous engagements. Marantzidis (2010, p97) claims that with under such adverse factors no army can last for long, but termination time may not be short either and conflict can take several turns before concluding[19].

To evaluate the conflict trap, two non-zero steady-states are calculated for each set of estimated parameters per period as described in Appendix A. The higher equilibrium is found to be asymptotically unstable in both phases, as the roots' module exceeds unity. In contrast, the lower equilibrium is asymptotically stable in both periods suggesting the presence of a conflict trap. Tellingly, the stable equilibrium values are found to be close to the historical average of battle deaths occurring in each phase, implying that the conflict could have had been perpetuated around these levels.

In the autumn 1948, a new impasse emerged after GNA first cleared Grammos but then failed to hold Vitsi. The high toll of casualties and massive defections that took place demoralized Greek military leadership and produced such serious divisions with the US mission to

[19] That outcomes are not necessarily determined by army numbers was colorfully expressed by a Government supporter who was skeptical about "the alleged mathematical assertions … on so many more armies than bandits … How then it happens that the former do not snatch the latter from the neck, to finish them off?"; Kathimerini 30/1/1049, reprinted in Rizospastis (2011, pp 397-398).

the point that its withdrawal was seriously considered; Woodhouse (1976, pp 144-145). It was only after the visit of the State and Defense Secretaries to Greece in October 1948 that US engagement was reaffirmed and the demoralized Government[20] got persuaded to plan new major offensives against DAG strongholds by appointing a hardliner veteran as Field Marshal.

In the Spring 1949, three developments weakened DAG: First its leadership that was favoring partisan warfare was replaced in January 1949 by a team more eager to engage in large-scale operations, despite poor training and equipment. Second, the logistic support that DAG was receiving from abroad was sharply diminished after the Soviet Union advised KKE leadership[21] in April 1949 to end it. Third, DAG became more vulnerable after Yugoslavia ceased to provide a safe backyard for retreating guerillas and sealed its borders in July 1949.

Even so, DAG was not succumbing. To resolve the impasse, an out-of-proportions escalation took place in the summer of 1949, exceeding all previous battles in all scores: human losses peaked for both sides as DAG casualties – including those captured or surrendered – reached 71% of its total strength and GNA dead tripled relative to the average in the previous two years. The air force was intensively involved in the operation and bombing reached unprecedented levels. It was due to this

[20] Averof (2010, pp 323-324) claims that high ranking officials in the US were considering to opt out Greece, while the Government was seriously contemplating defeat.
[21] According to his own testimony, the new DAG leader was notified in 20/4/1949 that "Stalin put forward the case for retreating, for ending the armed struggle"; quoted in Rizospastis (2011, p 449).

specific escalation combined with the logistical collapse of DAG that made its forces to be terminally defeated.[22]

5. Grievances

To examine whether and the extent to which the Greek Civil War was influenced by socioeconomic factors, a spatial analysis is undertaken at the beginning, the middle year and the last year of the conflict.

Political discontent against the Government was manifested twice in 1946, initially during the elections in March and later in the Referendum for the restoration of the Monarchy in September of that year. In the former, the Communist Party advocated abstention from the polls, but then it decided to participate in the latter by fervently supporting the republican ticket. Using data compiled by Nikolakopoulos (1985), an approximate[23] measure of political protestation is obtained as the simple average of abstention and republican vote as percentages of voting population in the 38 prefectures of the country. This measure is then regressed against various types of socioeconomic factors and grievances as explanatory factors.

First, the Marxist view is tested. According to KKE, Greek society was in a process of rapid proletarianization that was strengthening the struggle for the socialist transformation. The class-structure (PROLET) is

[22] The sweeping victory in Grammos was seen by many as vindicating the supremacy of military professionals over self-trained communist leaders who ignore fundamental principles of tactical war; see, for example, Tsakalotos (1971, p317). Though factually true, the assertion should also include huge material superiority as an explanatory factor.

[23] The republican ticket was supported not only by the communists but also by the various factions of Liberals, thus political discontent does not fully correspond to the influence of KKE. However as the Government employed all means available to secure the return of the King, opposing the royal ticket radicalized several non-communist activists and many of them were subsequently persecuted and joined the communist ranks.

calculated as the proportion of workers to total active population in each prefecture. As suggested by Miguel *et al* (2004) for estimating conflict situations, an instrumental variables approach is employed by considering that proletarianization is accelerated by rising unemployment (UNEMP) as an indicator of economic slackness and by the degree of capitalist concentration proxied here by the proportion of employees per firm (FEMPL) in each prefecture. Results in Table 4 show that the Marxist interpretation is neither significant at the 10% level nor has any explanatory power for the political discontent in 1946.

An alternative explanation is offered by three indices of social discontent rooted in pre-war grievances, namely the problem of refugees fled to Greece after the ill-fated campaign in Asia Minor in 1922, the collapse of small and medium size enterprises after the economic crisis in 1932 and the perennial rural question that had led to violent uprisings since the beginning of the 20th century. The first grievance is measured by the proportion of refugees per local population (REFUG), the second by the total number of real-estate foreclosures (FORCLS) enforced by the banks in 1934-38 and scaled to 100,000 inhabitants and the third by an index (RUREVL) of pre-war rural revolts per prefecture as compiled by Seferiadis (1999). As shown in Table 4, all these indices are found to be statistically significant and correctly signed, confirming the view of Close (2003) that much of the post-war political opposition was stemming from the fact that the Government was in no mood to correct past-entrenched grievances.

After partisan warfare was adopted as the main form of the armed struggle, guerillas were gathered in the mountains where DAG

headquarters were set up. Data are available for the concentrations in 11 HQs in January 1948, and for 21 ones between March and August 1949 and are subsequently used to analyze the spatial characteristics of the civil war in terms of morphology and local grievances. Morphology is measured by the altitude of mountains (MOUNT) and the distance (DISTNB) from the northern border of Greece, through which a safe refuge was found for retreating and regrouping. Other morphology indices, such as forest density, land cultivation or country roads, are not found to be significant in the estimation.

A measure of political grievances accumulated up to 1948 is the number of persecutions by state forces against local populations during 1945-46 as has been documented in a Report submitted by DAG in the United Nations later that year. A measure of the political grievances afterwards is the number of citizens prosecuted during 1946-48 in the emergency martial courts operating in nearby areas. Details of data definitions and compilations to correspond to the areas of DAG HQs are given in Appendix C and results are summarized in Table 4.

Estimation shows that guerilla concentrations in 1948 were stronger in high mountains and had a high elasticity with respect to political persecutions as around half of them seemed to choose joining DAG in order to avoid further purges. It is noticeable that the distance from borders is not found significant in 1948, as the strategy of DAG still aimed to spread the conflict all over the country. The pattern changed in 1949 as DAG troops retreated in the northern areas of Greece, thus both altitude and distance from border are found to be significant. A strong

elasticity with respect to prosecutions is again detected, virtually in the same range as the earlier persecutions.

6. The economic legacy of the Greek Civil War

Greece was already ruined before the Liberation in 1944 as population was decimated by either starvation or mass reprisals, most of the infrastructure was destroyed, essential goods were vanished, and markets were replaced by barter. Hyperinflation continued to reign in until 1946, and the currency was serially collapsing. To complete the picture of abject suffering, malaria was ravaging rural populations and was partially contained only after a huge humanitarian aid from the UN.

Yet, there is no sign that ordinary Greek people were keen to engage in yet another armed struggle right after one had just been ended. Inspired by the reconstruction programs elsewhere in Europe, the common expectation – shared by the Government but also by the Communist Party[24] - was that Greece would be helped by the Allies to rebuild the economy, improve the functioning of the state and restore safety and calm. In spite of the post-war chaos and open political confrontations, the Greek economy started to rebound in 1946 and it was likely to offer more rather than fewer opportunities for employment and prosperity; for an account of economic developments see Makinen (1984, 1986). Thus, the theories of greed reviewed in Section 2 do not seem to explain the motives behind the ensued conflict, though they cannot be ruled out

[24] KKE (1964, p524) in an unusual language emphasized the importance of the people "ensuring order and calm so as to rebuild the country".

completely[25]. For Greece the interaction between economic deterioration and the spread of civil strife rather than being in the direction assumed by Collier and Hoeffler (2001), most probably run from the latter to the former as discussed by Sambanis (2004).

After the conflict got escalated to a full Civil War, the economy was hit to a point that was not compensated by the influx of US and other international aid. Thousands of people were killed or otherwise displaced, transportation and communications were cut, and production halted in several areas. Thomadakis (1995) demonstrates that the financing of reconstruction was severed by excessive military spending and this further fuelled further social discontent and led to failures of reconstruction and stabilization policies. While the economies in other occupied countries were stabilized immediately after the end of the war in 1945 and subsequently rebounded on a speedy growth path, growth in Greece remained slack until 1949 widening the gap with the rest of Europe. Growth accelerated only after 1950 and GDP reached its potential trajectory in 1956, confirming Collier and Hoeffler (2007, p 40) that economic activity takes about ten years to recover after a civil war. To assess the impact of civil strife on GDP two alternative approaches are adopted:

I.Separating WW2 and Civil War effects:

Between 1940 and 1949 Greece suffered both from World War II (WW2) and the Civil War. To delineate the effects of the latter on Greek GDP,

[25] Such motives may be generated when the adversaries adopt exclusion tactics for the other side. In fact, exclusion politics were imposed in Greece at a massive scale during the dictatorship 1936-40, only to be brutally exceeded by the following occupation. The establishment wanted this exclusion to continue in the post-war period, while KKE was advocating a socialist revolution that would eliminate the capitalist sector.

two groups of Western European countries are considered as control variables[26]: The group of countries that remained neutral (Sweden, Portugal, Ireland and Switzerland) and the group of occupied countries other than Greece (Netherlands, Belgium, France, Denmark, Norway and Finland). Comparing the second with the first, an assessment of the effects of WW2 is obtained which is found to depend on the human toll that befell each country. The estimate is then projected on Greece to give potential GDP in the absence of the civil war. Data are taken from Maddison historical series expressed in 1990 US dollars and indexed at 1930 as shown in Fig. 7a. Estimation runs for 1930-1956 so as to allow for a ten year span[27] before and after WW2; details are given in Appendix C.

Fig. 7a GDP index 1930=100

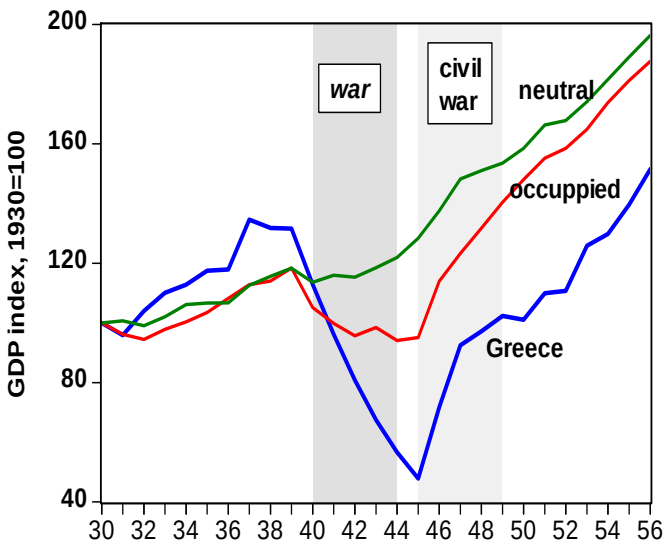
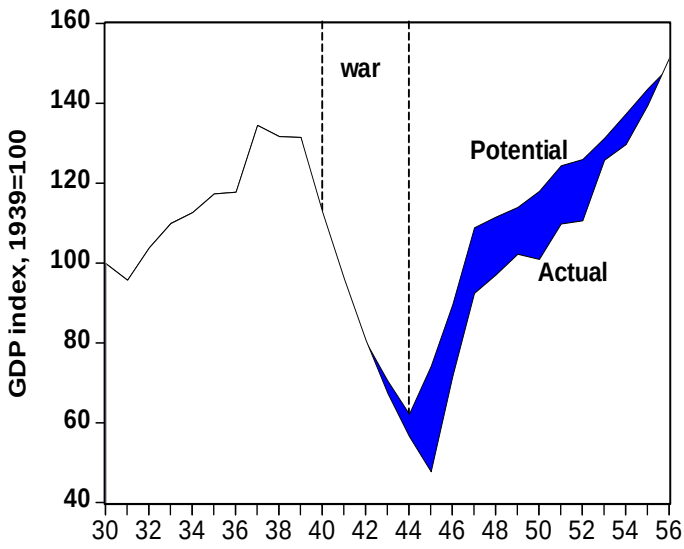


Fig. 7b Actual and potential GDP for Greece 1940-1956.



Source: Maddison historical series

[26] Spain is excluded from the neutral group because it was affected by its own civil war in the 1930s and UK from the second group because it was not occupied. Countries of Eastern Europe are not considered as followed a different economic system after 1945.

[27] Besides equal time spans, the choice of 1930 means that all countries in both groups were sharing a common institutional economic framework within the Gold Exchange system, at least for some years. Also until 1958 when the European Economic Community was founded, there was no major institutional differentiation among them.

The difference between potential $(YEST_t^{GR})$ and actual GDP (Y_t^{GR}) is taken as a proxy for the civil war effect as shown in Fig. 7b, and cumulative losses are finally obtained over the period 1945-1956 according to the discounting formula:

$$LOSS_t^{GR} = \{YEST_t^{GR} - Y_t^{GR}\} + (1+r)^{-1} \cdot LOSS_{t-1}^{GR} \tag{4}$$

Using a 5% discount rate per annum, cumulative losses are found to represent 95% of GDP in 1956. To check robustness of the estimate an alternative approach based on measuring the destruction of production factors is also applied.

II.Growth accounting:

Assuming a production function with constant returns to scale, output in constant prices *(Y)* is given by:

$$Y = A(kN)^{\eta} Z^{\varepsilon} L^{1-\varepsilon-\eta} \tag{5}$$

where *A, N, k, Z* and *L* denote technology, number of factories, capital stock per factory, rural livestock and total wage labor respectively. Parameters *(η, ε)* denote the non-agricultural and agricultural capital stock elasticities of output respectively, and are proxied by the relative shares of capital income in total production. If these factors of production are destroyed by *ΔN, ΔZ* and *ΔL* respectively while technology and capital size per unit of production remains unaffected, output growth drops according to the accounting equation by:

$$\Delta g_Y = \eta \frac{\Delta N}{N} + \varepsilon \frac{\Delta Z}{Z} + (1 - \eta - \varepsilon) \frac{\Delta L}{L} \tag{6}$$

The loss in employment attributed to the occurrence of Civil War is accounted for by the reduction of active population due to deaths and severe battle-casualties, displacements of rural populations during the conflict, long-term internment of political opponents and expatriations that took place after the war ended as defeated guerillas and their families fled Greece for decades to come. As displayed in Table 4 aggregate losses represented 10.22% of active labour force in 1951, the nearest Census available for the civil war years.

The destruction of industrial capital and that of the livestock are evaluated in Appendix B and shown in Table 4, and then an average output loss of -12.25% per annum is finally calculated. Discounted at 5% annually over a ten year period this leads to a total loss of 99.37% of the GDP in 1956, not much above the figure obtained by the first approach. Both estimates fall within the range of [90÷110%] calculated by Collier and Hoeffler (2007) as the confidence interval for GDP losses due to a relatively long civil war. Given the huge cost inflicted on the country, the question is why the confrontation went out of control for so many years and this is discussed below.

7. The prolongation of conflict as a strategic and institutional failure

In Section 3, the prolongation of conflict was accounted for by the military capabilities of the opponents but this can hardly justify the failure of reaching an early compromise. It is ex post clear that a negotiated end between the two sides could have had been to their mutual advantage, thus the failure to do so must be explained by the

inability of adversaries to comprehend the situation and its dire consequences. Though it is difficult to imagine any of the conflict-perpetuating failures described in Section 2 that has not been committed by the adversaries in the GCW, it is perhaps useful to examine the mechanisms through which such dramatic errors did actually take place.

7.1. The broken trust

The domestic rivals repeatedly searched for some sort of compromise, at least until the end 0f 1948, but failed all the way through partly because their own priors about the other's sincerity and partly because of the pressure for more aggressiveness exercised by the rank and file of each side. Both reasons were deeply rooted in the way that the Varkiza Agreement on disarmament in 1945 was implemented in practice. Instead of an opportunity for reconciliation and integration, the Left felt it as a humiliation after its supporters were surrendered and subsequently persecuted, while the Right saw it as mission unaccomplished in its resolve to annihilate rivals and dominate post-war politics. Sfikas (2001) argues that KKE kept putting some extra conditions on its peace proposals as hedging against being cheated for a second time, and invariably this was giving the Government hardliners the pretext to reject the offer as unacceptable.

Another characteristic episode with pretentious conditions took place when KKE made an appeal for ceasefire in May 1948 by denouncing seizing power by force and the Government expressed some interest but demanded[28] that all children transferred by DAG to the People's

[28] For details see Averof (2010, p292).

Republics in Eastern Europe fore with return forewith to Greece as "… an unfailing test for the sincerity of the proposals". The ultimatum was rejected by DAG and a major GNA offensive followed in a few weeks time, thus re-escalating the conflict.

Uncontrollable violence was also propagated by rank and file as both armies included rural outlaws that had long practiced looting in the villages. After WW2 several of local militias joined either GNA or DAG in order to gain legitimacy and have more seizure opportunities[29]. DAG for its part had issued many warnings against looting rural populations, while the Government had to send troops against local rightwing barons; for an account see Gregoriadis (2011, p127). But as Civil War was spreading, alertness by each side on its own banditry was quickly subordinated to the aggressiveness against the other.

7.2. Signaling by proxy

In order to overcome the signaling breakdown, both sides attempted to invest credibility on their proposals by submitting them to the other's patrons. Thus the Government approached the Soviet Union asking it to convince KKE to abandon the armed struggle, while the Left developed regular contacts with the British who in 1947 endorsed several of their ideas for reconciliation; see Sfikas (2002, p85). But as the geopolitical landscape was entering the Cold War phase, such improvisations were quickly superseded by events for the following reasons.

On the one hand, USSR was unwilling to get involved in arbitrating the Greek conflict and was rather trying to get completely disentangled and

[29] A massive assimilation of this type was also happening in China's civil war at that time and Mao was fearing that bandits gave the Red Army a 'mentality of roving insurgents'; see Hobsbawm (2000, p 116).

concentrate on its own security concerns in Eastern Europe. On the other, the attitudes of US and UK had also been reversed after the Cold War was declared. During the battle of Athens in 1945, it was the the British who were adamant about crushing the Left while the Americans[30] were openly supporting its participation to the Government as the only guarantee against the dominance of the Right. Even when the Truman Doctrine was proclaimed a sizable majority of Americans felt that it was wrong to bypass the UN (Mazower (2012, p227), and US officials were still suggesting that a 'real amnesty' should be granted as a precondition for the economic reconstruction (Porter 2006, p229).

But as soon as US replaced the British in the role of the mighty guardian of Greece, both switched views on how the impasse should be resolved. In 1948, the British Government produced a plan for ending hostilities that incorporated several of the preconditions set by communists, and it was now the turn of Americans to reject it and opt for a clear victory over DAG. Besides, the British had been sidelined in the geopolitics of the Cold War and their delayed eagerness to reconcile Greece was not heard by those in the frontline.

7.3. KKE: A cause without a strategy

The reason why external conditions and foreign considerations were of so crucial importance was of course that the domestic rivals lacked a coherent strategy of their own. To start with, KKE was confused on any

[30] Before the Cold War started, Americans were highly critical of the inefficiency and unfairness of the socio-economic conditions in Greece. For example, Porter (2006, p225) was openly dismissive of the "banking clique … determined – above everything else – to protect its financial privileges whatever the cost on the economic health of the country". The remark strongly echoes the communist claims that '… (financial) scandals and embezzlements increase plutocratic profits and reveal the rottenness and decomposition of the ruling classes'; see KKE (1964, p568).

major issue: For example, the final objective of the armed struggle was never made clear. Initially, the aim was a 'democratic integration', but later shifted to swiftly reaching the stage of a 'socialist transformation', thus stripping any remaining political support from non-communist sympathizers. The confusion was further multiplied by the question on whether the party was consciously engaged in the civil war or just driven by the events. Even years after the conflict, top cadres continued to claim that such a decision was never taken while others insisted that it was confidentially planned[31]. Confusion was openly manifested when KKE abstained from parliamentary elections in March 1946 to avoid legitimizing an allegedly rigged poll, but a few months later it took part in the restoration referendum that was indeed conducted with open violence against republicans[32].

Moreover, KKE remained throughout indecisive on whether to pursue a full urban confrontation as advocated by its leader or instead engage in partisan action as favored by the DAG chief. Such a basic disagreement was a critical violation of war principles[33] and soon led to adventurist tactics and pointless bloodshed in order to conceal it. Eventually, the gap between the two views led to the dismissal of DAG' chief in January 1949 but rather than making the leadership more realistic this widened the illusions about surviving the conflict. As successor's main credential was party loyalty, DAG uncritically endorsed the all-out confrontation with GNA that led to its demise a few months later. A crucial

[31] Napoleon (1993, p89) had warned that 'in civil wars it is not everybody's to know what course to follow and something more than military prudence is required'.
[32] Even staunch supporters of the King admitted that the process was far from transparent; see, for example, Averof (2010, p).
[33] Clausewitz (1976, p579) had strongly advised that 'no one starts a war – or rather, no one in his senses should do so – without first being clear in his mind what he intends to achieve by that war and how he intends to conduct it'.

consequence of dispersed action was that it made the lack of professional leadership to look less critical on the battle-field. As most of the DAG chiefs were self-trained Resistance fighters rather than career officers, this meant that leadership never felt obliged to operationally evaluate the situation and allowed party hardliners to insist for the continuation of the conflict[34].

Another deficiency, and quite critical as it turned to be, was the opportunistic stance of KKE on the 'national issue' of Greek Macedonia. In the aftermath of WW2, KKE had initially adopted an uncompromising position by pledging that the rights and equality of Slav-speaking population should be implemented within the territory of Greece, the borders of which "… are sacrosanct and inviolable[35]". But as civil war intensified, DAG was critically depended on logistical support by Yugoslavia and in the beginning of 1949 KKE declared[36] that Slav-Macedonians would be granted full "national emancipation". Instead of attracting more Slav-speaking fighters to its ranks, DAG suffered dearly as the Government immediately seized the opportunity and accused it for treason, while Yugoslavia remained unimpressed and finally closed the borders a few months later. It was only after its defeat[37] that KKE denounced "the partition plans by Tito against Greek Macedonia" and admitted that its own *volte face* constituted a 'serious error'.

[34] Perhaps the most notorious rejection of reality was the claim by the KKE leader two months *after* the final defeat in Grammos that "the main forces of DAG remain unscathed with arms by the side"!
[35] Second Plenary, February 1946; reprinted in KKE (1964, p 549).
[36] Fifth Plenary, January 1949; reprinted in KKE (1964, p 577).
[37] Sixth Plenary, October 1949; reprinted in KKE (1964, p 583).

7.4. The Government: Power without inclusion

The Government strategy was also severed by the lack of a robust leadership. Factionalism was the rule of the day and ten postwar Governments had been formed by the end of 1947; i.e. with less than three months duration in average. This made the search for a comprehensive strategy to look vain and the hope was that the political system will become more coherent only under the aegis of the King. Having spent most of his adult years either supporting the pre-war dictatorship or abroad and hardly speaking the language[38], the King showed no interest in inspiring national reconciliation or just improving the life of Greek citizens; see Porter (2006, p83) and Gregoriadis (1973, pp192-194). His low-key successor seemed to be more consensual but was quickly overpowered by his hardliner spouse[39] and any notion of compromise evaporated quickly.

The incompetence of the Government was omnipresent[40] and ministers' sole concern seemed to be how to keep in office. In fact, the chaotic situation made them more likely to stay because usually uncertainty blurs personal accounting, and this led to remain unaccounted for neglecting reconstruction and thus perpetuating the grievances of the population. Thus small parties did not have a real interest in reconciliation, since the participation of the Left in the Government would have meant the ending of theirs.

[38] According to a GNA propagandist, the King was unable to properly deliver his first radio Address to the Nation in 29/9/1946 despite intensive rehearsals; see Sifnaios (1950, p145).
[39] The Government was frequently embarrassed by Queen Frederika's attitudes of replacing the King in visiting the war front or brandishing guerillas as "common thieves"; see Kalyvas (2006, p 63).
[40] Porter (2006, p80 and 162).

Overwhelmed by clientilistic concerns, the Government was increasingly in favor of excluding by force its opponents from participating in power sharing or distributional institutions. In the absence of a genuine democratic process to involve and express the new social balances that emerged after WW2, the political and institutional segregation ignited tensions and allowed the extremes of both the Right and the Left to capitalize on the prospect of an all-out confrontation and the winner to take them all as discussed in Skarpedas (2008).

A similar pledge by KKE was resonating in several of the excluded, though today, after the collapse of centrally planned economies in Eastern Europe, it is perhaps difficult to imagine that the hope of rising prosperity was invested in the expectation of socialism. But, as Fukuyama (2012) notes, during the first half of the twentieth century there was a strong consensus that some form of socialism was unavoidable for all advanced countries. In Greece in particular, the cause was even more credible than elsewhere as the Left had seized during WW2 both the patriotic agenda by massively resisting occupation and the distribution agenda by organizing food supplies to the starving population.

8. Conclusions

In other cases of history, the costs and perils of a civil conflict accelerate the introduction and empowerment of institutions that promote social equity and participation in public life. For example, in the aftermath of the US Civil War the victors immediately started the Reconstruction phase in the Confederacy states by advancing political emancipation of

the slaves, though the plan was partially thwarted later. In Belgium the risk of civil conflict was highly probable in the aftermath of WW2 but finally an agreement between the rival sides helped to diffuse tensions; for an account see Conway (2012). Similarly in Italy civil war was avoided after the Communist Party denounced the arms struggle and accepted the Constitution[41] despite the pressure exercised by hardliners to start the conflict.

In contrast, the politics of exclusion that ruled before and after the Civil War in Greece rather than being replaced by inclusion institutions became the norm. Not only those in the guerilla camps were severely punished or denied the right to return to Greece, but a great number of actual or hypothesized sympathizers continued to be persecuted for years to come. The paper showed that Greece was entrapped in a prolonged conflict that resulted in major losses and prevented Greece to follow the rapid economic growth in the post-war years.

But this was not the end of the dire consequences. As a meticulous system of policing enforced the exclusion of political rivals from public posts and several economic activities, emigration was their only option and this resulted to further losses being accumulated long after hostilities ended. The country had yet to undergo a seven year dictatorship before political segregation finally ended in 1974 and a reconciliation process was gradually set in. As social violence and political extremism re-emerge in today's Greece as a consequence of the

[41] Applebaum (2012, p 49) describes that Togliati, the Communist Party Secretary, was selected by Communist International in Moscow to play a key role in postwar government in Italy. However, Togliati consistently stood against the armed struggle, even when the Left was denied participation in the government in 1947. According to Rizas (2001), he was reprimanded by Kominform in Moscow as his policies were considered to be defensive and passive.

deep economic crisis, some lessons of history may be worth recalling. The present study showed that if one starts with deeply divisive politics, it is likely to see the confrontation to escalate into a self-perpetuated conflict.

Appendix A: A mathematical model of conflict

Possible equilibria have to satisfy $\Delta R^* = \Delta S^* = 0$ and are obtained – as shown in Fig. 8a - at the intersection of the functions:

$$S^* = \frac{\alpha}{\beta} - \frac{\theta}{\beta R^*} \tag{7a}$$

$$S^* = \frac{\varphi}{\gamma - \delta R^*} \tag{7b}$$

Fig. 8a Positive conflict equilibria.

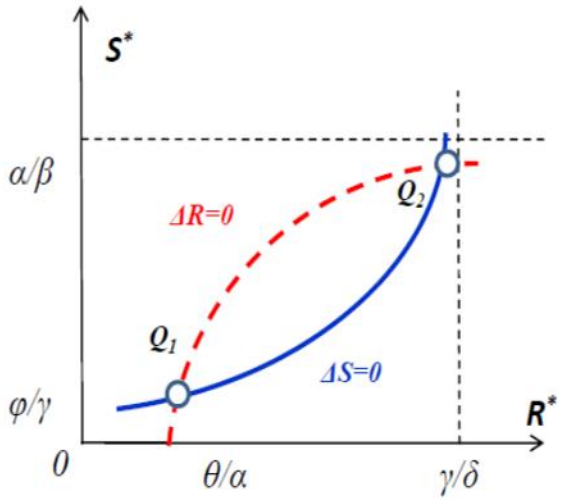
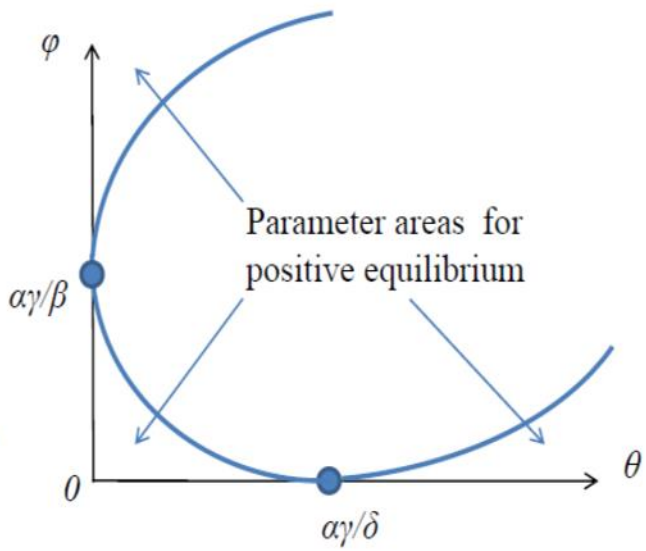


Fig. 8b Parameters in the pointed areas result in positive equilibria



The system leads to a second-order equation and the existence and type of equilibria are determined by the sign of the discriminant:

$$D = (\alpha\gamma + \theta\delta - \varphi\beta)^2 - 4\alpha\gamma\delta\theta \tag{8}$$

Two positive equilibria require that *D>0*, and is straightforward to show that this is ensured with the self-protection parameters satisfying one of the following conditions:

$$\sqrt{\alpha\gamma} > \sqrt{\beta\varphi} + \sqrt{\delta\theta} \quad or \quad \sqrt{\alpha\gamma} < \left|\sqrt{\beta\varphi} - \sqrt{\delta\theta}\right| \tag{9}$$

A unique positive equilibrium exists if one of the conditions holds as equality, and no equilibrium is found if both are violated. Permissible areas for the existence of equilibrium are shown in Fig.8b. The characteristics roots that drive the dynamics of the system are found as the eigenvalues of the Jacobian matrix evaluated at the various steady-states *(R*, S*)* as follows:

$$J(R^*,S^*) = \begin{bmatrix} \frac{\partial R_t}{\partial R_{t-1}} & \frac{\partial R_t}{\partial S_{t-1}} \\ \frac{\partial S_t}{\partial R_{t-1}} & \frac{\partial S_t}{\partial S_{t-1}} \end{bmatrix} = \frac{1}{\Omega} \cdot \begin{bmatrix} 1 - \frac{\theta}{R^*} & \beta R^*(1 - \frac{\varphi}{S^*}) \\ \delta S^*(1 - \frac{\theta}{R^*}) & 1 - \frac{\varphi}{S^*} \end{bmatrix}$$

(10)

with expression *(Ω)* defined as:

$$\Omega \triangleq 1 - \beta\delta R^* S^* \tag{11}$$

Convergence to equilibrium requires that the module of the eigenvalues is below unity[42], while complex roots imply limit cycles. Since expressions are nonlinear, results are only obtained numerically. For given disturbances and parameter values, the system may exhibit a variety of dynamics for non-trivial equilibrium levels.

[42] The characteristic equation takes the form z^2-*bz+c=0*, where *(b)* is calculated as the trace and *(c)* as the determinant of the Jacobian. A necessary and sufficient condition for two stable roots is *|b|<1+c<2*, no matter if roots are real or complex.

In contrast, autonomous lagged systems preclude the existence of stable non-trivial steady-states and are thus unsuitable to describe prolonged conflicts, unless a more complicated non-linear structure is assumed[43]. To see why, consider the system:

$$\Delta R_t = R_{t-1} \cdot [-\alpha + \beta S_{t-1}] \tag{12a}$$

$$\Delta S_t = S_{t-1} \cdot [-\gamma + \delta R_{t-1}] \tag{12b}$$

Four steady-states are obtained at *(0,0), (0,α/β), (γ/δ,0), (γ/δ, α/β)* and the following Jacobian matrices are formed respectively:

$$J_1 = \begin{bmatrix} 1-\alpha & 0 \\ 0 & 1-\gamma \end{bmatrix},\ J_2 = \begin{bmatrix} 1 & 0 \\ \frac{\alpha\delta}{\beta} & 1-\gamma \end{bmatrix},\ J_3 = \begin{bmatrix} 1-\alpha & \frac{\beta\gamma}{\delta} \\ 0 & 1 \end{bmatrix},\ J_4 = \begin{bmatrix} 1 & \frac{\beta\gamma}{\delta} \\ \frac{\alpha\delta}{\beta} & 1 \end{bmatrix} \tag{13}$$

Characteristic roots are easily obtained as the four pairs $(1-\alpha, 1-\gamma), (1, 1-\gamma), (1-\alpha, 1)$ and $(1 \pm \sqrt{\alpha\gamma})$. Stability holds only for the zero equilibrium if *α,γ>0,* the second and third are indeterminate, while the non-trivial equilibrium is *always* unstable. An non-trivial unstable limit cycle occurs only if *αγ<0,* i.e. when one of the self-protection parameters turns negative, thus awkwardly assuming that the army becomes self-destructive.[44]

Similar problems arise even in continuous-time modeling that takes the form:

[43] For example, Din (2013) considers a non-linear autonomous discrete-time model in fractional form and shows that the non-trivial equilibrium is asymptotically stable only if several conditions are imposed upon the parameters.

[44] Past casualties lead to more losses in the future if the army is either constantly depleted from critical support units or is panic stricken after a major defeat but none of them is compatible with a prolonged conflict. Losses can also be self-multiplied in suicidal insurgencies where a new wave of martyrs follows those previously perished but, again, this cannot last for long.

$$\dot{R} = R \cdot [-\alpha + \beta S] \tag{14a}$$

$$\dot{S} = S \cdot [-\gamma + \delta R] \tag{14b}$$

The non-zero equilibrium and the Jacobian are the same as in (13). Eigenvalues are given by $\pm\sqrt{\alpha\gamma}$, thus if $\alpha\gamma>0$ the system is unstable, while for $\alpha\gamma<0$ it becomes indeterminate with a limit cycle. For the non-zero steady-state to be meaningful, this requires $\beta\delta<0$, again implying improbable opposite behaviors for the two fighting sides.

Appendix B: An estimate of GDP losses due to the civil war

Estimating the war effect: The effect of WW2 on the economic activity of occupied countries other than Greece is estimated by the following equation:

$$\Delta lnYOCC = 0.00073 + 1.126\Delta lnYNEUT + [-0.174WAR + 0.128REC] \cdot WTOL$$

(15)

(0.078) (4.038) (4.540) (2.474)

OLS, 1931-1956, R2bar=0.33, DW=1.92, F-stat=26.49(p=0.0)

In the above expression *YOCC* is GDP in 1990 US Dollars of occupied countries, namely France, Netherlands, Belgium, Denmark, Norway and Finland, while YNEUT is the average of the neutral group (Sweden, Portugal, Ireland and Switzerland). Two time dummies are introduced to account for the span of WW2 (i.e. *WAR=1* for 1940-44), and another for the reconstruction period, i.e. *REC=1* for 1945-46. Both are scaled by the human loss *(WTOL)* expressed as percent of total population per occupied country. Potential GDP $(YEST_t^{GR})$ for Greece for each period 1940-1956 is calculated from the above equation by substituting the Greek war toll:

$$\Delta lnYEST_t^{GR} = 0.00073 + 1.126\Delta lnYNEUT_t + [-0.174WAR_t + 0.128REC_t]WTOL^{GR}$$
(16)

The cumulative output loss is then evaluated by (4) and found to be 95% of GDP in 1956.

A production function approach: The destruction of livestock was evaluated as 9.91% of the level in 1940 as no livestock Census was repeated in 1951. This probably underestimates the loss as a proportion of current level as livestock was severed during the occupation due to hunger and plunder.

Assuming that factories vary at par with the growth of industrial output (Q) and employment (i.e. $\Delta N/N=\Delta L/L=\Delta Q/Q=q$), then by using prewar industrial data the loss of capital due to civil war is given by:

$$\frac{\Delta N_{CW}}{N_{CW}} = \frac{\Delta N_{CW}}{\Delta N(prewar)} \cdot \frac{N(prewar)}{N_{CW}} \cdot q(prewar)] \qquad (17)$$

where subscripts *PW* and *CW* denote prewar and civil war periods respectively and g_{QPW} is the annual growth rate of industrial output during 1934-38 obtained from economic statistics in ESYE (1939). As industrial output had reached in 1949 90% of its prewar level[45] one, by assuming away technology changes, can set $N_{CW} = 0.90N_{PW}$ and use data from Table 4 to obtain a reduction of physical capital equal to -15.76% of its stock. The destruction of livestock was evaluated as 9.91% of the level in 1940 as no livestock Census was repeated in 1951. Both figures probably underestimate the loss as a proportion of current level stocks, since they were severed during the occupation due to hunger, plunder and reprisals.

The share of non-agricultural capital income is obtained from Christodoulakis et al (1996, p212) as $\eta=0.382$ in average over 1954-1960

[45] As described by Stathakis (2002, p 66).

which is the nearest period with disaggregated data available. A similar calculation for the rural stock by taking into account that in agriculture 90% were self-employed or employers gives $\varepsilon=0.253$, and substituting into (6) the total output growth rate is found to drop by -12.15% annually.

Appendix C: Data and sources

Nomenclature

Nomenclature of the Greek Civil War was never agreeable as each side was offensively labeling its opponents. For the Government the army was the Greek National Army (GNA) while its rivals were 'bandits', 'robber-bandits' or even 'Slav-gangs'. The communists had proclaimed the Democratic Army of Greece (DAG) and brandished Government as 'imperialist lackeys' and its forces as 'monarchist-fascist troops', as well as 'robber-bandits' by reciprocation. The war itself was accordingly called 'contra-bandit' or 'liberation struggle' and was mutually described as a 'civil' one only in the 1980s. The present paper adopts a terminology as close as possible to each side's preferences for its own troops. Thus GNA stands for Government troops, army soldiers and state forces, while guerillas, fighters and rebel forces ('*andartes'*) are interchanged in describing DAG.

Main data sources

DAG, 1947, *Report to the UN*, published under the title "That's how Civil War started", Glaros editions, Athens.

ESYE, 1939, *Annuaire Statistique de la Grèce 1939*, Athens.

ESYE, 1946, *Population de la Grèce 1940*, Athens.

ESYE, 1955, *Population de la Grèce 1951*, Athens.

GES, 1970, *The Greek Army in the Anti-guerilla Struggle 1946-49: The cleansing of Roumeli and the first battle of Grammos,* Athens, (in Greek).

GES, 1971, *The Greek Army in the Anti-guerilla Struggle 1946-49: The first year of the anti-guerilla struggle 1946*, Athens, (in Greek).

GES, 1976, *The Greek Army in the Anti-guerilla Struggle 1946-49: Operations of the Third Army Corps 1947-1949*, Athens, (in Greek).

GES, 1980, *The Greek Army in the Anti-guerilla Struggle 1946-49: The second year of the anti-guerilla struggle 1947*, Athens, (in Greek).

JUSMAPG, *History, 1948-1950*, National Archives, US.

Michiotis N., 2007, *In the name of the King: Emergency martial courts in Greece 1946-1960*, Synchroni Epochi editions, Athens, (in Greek).

Nikolakopoulos E., 1985, *Parties and parliamentary elections in Greece 1946-1964: Electoral geography of political forces,* EKKE editions, Athens, (in Greek).

Compiling battle data

State army (GNA) figures include the Army, Gendarmerie and armed nationalist groups. Rebel figures (DAG) include the fighters and civilians involved in skirmishes. Figures for 1946, are from GES (1971) as follows: January-June 1946, monthly aggregates of all battles and skirmishes, classified by the author.

Figures for July-December 1946, from Tables pp 54, 87, 93, 99, 110, 158 and 165. Data from GES (1980) are given per military operation with the following adjustemnts: aggregate data for January and February 1947 are split equally; Operation Korax (pp 173, 179) split into May and June figures; operation Lelaps (p257) into August and September.

Figures for surrendered rebels in 1946 are from GES (1971, Table VII, p 235). For 1947, from GES (1980) for the areas under the A and B Army Corps and GES (1976) for the areas under the C Army Corps. For 1947, data are from GES (1980), Diagrams 4 & 5, pp 386-387. For 1948-49 : JUSMAPG History, 1949.

Variables from archives

ABS46: Abstention rate in the general elections of 31 March 1946. Calculated as the difference between participation rates in 1946 and 1936, and that in 1951. Source: Nikolakopoulos (1985) and personal communication.

DAG : Number of guerrilla fighters with the Democratic Army of Greece, monthly

DHQ_area: Number of DAG fighters grouped per headquarters and mountain formations. Data for January 1948, January to July 1949, September and December 1949. Source: JUSMAPG, History, 1948-1949, maps.

DISPL : Total number of evacuees from villages in Northern Greece. *Source:* Laiou (1987), Table II, 2. Number of Displaced Persons in Northern Greece, by prefecture.

GNA: Number of personnel in the Greek National Army, monthly figures.

PROSEC: Number of leftwing citizens prosecuted in the emergency martial courts during 1946-51. Initially martial courts were established in eleven cities, but as civil war was intensifying they were extended to

thirty areas. Allocation is similar to that used for persecutions in 1945-46. *Source:* Michiotis (2007, Tables 1 & 2, pp 235-236).

PURGE: Number of persons persecuted and victimized during 1945-46 as described in DAG (1947). Data cover seven areas close to guerilla HQs in Central and Northern Greece as explained in Rodakis and Grammenos (1987, pp 383-390). To correspond to more disaggregated guerilla formations the seven regions are artificially split as shown in Table 5. *Source*: Rizospastis (2011, pp 138-140).

RCAP: Rebel fighters captured, monthly.

REP46: Anti-royal vote in the Referendum of 1 September 1946. Calculated as the percent rate of republican and blank tickets in total votes. *Source:* Nikolakopoulos (1985) and personal communication.

RKLD: Battle deaths of DAG, monthly.

RSUR: Rebel fighters surrendered to GNA, monthly.

RWND: Wounded of DAG, monthly.

SKLD: Battle deaths of GNA, monthly.

SMIA: GNA soldiers missing in action, monthly.

SWND: Wounded of GNA, monthly.

Other variables

DISTNB: Distance of DAG HQs from the northern borders in km; calculated by the author.

FORCLS: Foreclosures of real estate property per 100,000 habitants in each prefecture, annual average 1934-1938; population as in 1940 Census. Grouped from original data per Tribunal Court ('Protodikeion'). Data for Kilkis and Thesprotia not available. Source: ESYE (1939, Table 16, p306-307), *Annuaire Statistique de la Grèce 1939*, Athens.

GDP: GDP annual data in million 1990 International Geary-Khamis dollars. *Source:* Angus Maddison Historical Statistics of the World Economy

MOUNT: Altitude of mountains.

Source: http://en.wikipedia.org/wiki/List_of_mountains_in_Greece

PROLET: Proportion of workers in total active population. Source: ESYE (1958), Table 1, pp 11-43.

REFUG: Refugees as percent of prefecture's population. *Source:* ESYE (1923), Tables II and III, pp 10-15. The census was conducted in 33 prefectures and data were adjusted by provinces to conform with the division into 38 prefectures.

RUREVL: Index of prewar rural militancy. Source: Seferiadis (1999) where events are described in chronological order. The index was set from 1 for rallies to 8 for rebellions. Data represent cumulative rural grievance in each prefecture over the period 1904-1936.

UNEMP: Rate of unemployment. Unemployed persons as percent of total active population. Source: ESYE (1958), Table 1, pp 11-43.

WTOL: Human losses in WW2 as percent of population as calculated by Frumkin G., 1951, *Population Changes in Europe Since 1939*, Geneva. Source: http://en.wikipedia.org/wiki/World_War_II_casualties.

Appendix D: Tables

Table 1. Key statistics of total battle-deaths and casualties

	Total battle deaths		Total casualties	
Unit root test 46:07-49:08	-1.466 (p=0.53)		-1.027 (p=0.733)	
Jarque_Bera	2.72 (p=0.255)		2.98 (p=0.225)	
Correllation (j=0)	0.828		0.801	
Lag (j= -1)	0.435		0.533	
Lag (j= -2)				
Breaking points of detrended series				
47:12	F=0.31 LLR= 0.278		0.0722;0.0530	
48:01	0.126; 0.099		0.0072; 0.0041	
48:02	0.0775; 0.0574		0.0076; 0.0043	
48:03	0.0187; 0.0117		0.0019; 0.0009	
Statistics	***Phase I 47:07-47:12***	***Phase II 48:01-49:08***	***Phase I 47:07-47:12***	***Phase II 48:01-49:08***
Mean	454	1714	1165	9023
Std dev	340	629	848	3150
Volatility %	75%	37%	73%	35%
Pareto c.c.d.f.	λ=0.396	λ=1.55	λ=0.62	λ=1.60

Note: (F) denotes the F-statistic and LR the likelihood ratio
Source: Data as defined in Appendix C.

Table 2. Monthly estimates of battle-deaths dynamics.

Dependent variable → Independent variable ↓	**Phase I 46:07- 47:12**		**Phase II 48:01- 49:09**	
	Rebels' battle deaths	***State's battle deaths***	***Rebels' battle deaths***	***State's battle deaths***
constant	0.145* (1.79)	0.0672*** (3.40)	1.088*** (3.95)	0.237*** (4.02)
$-\alpha$ Rebels' deaths(t-1),	-1.068** (2.56)		-1.156*** (6.00)	
β State's deaths(t)	7.17* (1.84)		1.267*** (3.34)	
$-\gamma$ State's deaths(t-1)		-1.128*** (4.44)		-1.697*** (7.20)
δ Rebels' deaths(t)		0.940** (2.54)		0.664*** (4.59)
nobs	18	18	21	21
R^2 adj	0.257	0.518	0.645	0.715
DW	1.677	1.713	1.615	1.563
F-stat (prob)	3.94(0.042)	10.15(0.002)	19.3(0.00)	26.1(0.00)
High equilibrium *Characteristic roots*	0.628	0.125	1.651	0.395
	-1.18 and 5.78		-0.52 and 2.13	
Low equilibrium *Characteristic roots*	**0.227**	**0.074**	**1.451**	**0.324**
	0.08 and 0.42		-0.02 and 0.88	
Historical average	**0.309**	**0.084**	**1.364**	**0.370**

Note: Variables in '000s. t-satistics in brackets. One, two or three stars indicate significance at the 10, 5 and 1% level respectively. For the F-statistics probabilities are in brackets.

Table 3. Grievances, political discontent and guerilla formations

Dependent variable → Independent variable ↓	***Republican vote & Abstention 1946***			***Rebels' spatial concentration***	
	Marxist grievance	**Urban grievance**	**Urban & rural**	**1948:01**	**1949:03-07**
constant	17.989 (2.33)**	15.4076 (4.22)***	6.3242 (1.15)	-5839.79 (3.13)**	-1288.33 (1.87)*
Proletarianization [a] (workers per active population)	0.444 (1.59)				
Refugees % population		0.5072 (2.64)**	0.8552 (2.88)***		
Foreclosures per 100,000		0.5158 (3.31)***	0.6166 (3.31)***		
Agrarian revolts[b] per 100,000			0.6851 (1.78)*		
Early persecutions 1945-46				0.497 (2.90)**	
Court-martialed 7/1946-12/1948					0.4289 (2.11)**
Mountain Altitude (m)				3.090 (3.07)**	1.128 (2.88)***
Distance from border (km)				-	-2.409 (3.41)***
Method	2-Stage LS	OLS	OLS	OLS	OLS, period effects
Nobs	38	36	25	11x1	21x5
R^2 adj	0.002	0.34	0.41	0.799	0.246
DW	0.90	1.28	2.00	0.00	0.137
F-stat (prob)	2.53(0.12)	9.28(0.0004)	6.49(0.003)	20.97(0.0006)	5.18(0.00)

Notes: (a) Instrumental variables include the rate of unemployment and the degree of business concentration proxied by the ratio of employees to employers. (b) The prefecture of Messenia is excluded as an outlier because the index of agrarian protest is unusually high, but political discontent too low - probably due to openly rigged elections. Data as defined in Appendix C.

Table 4. Human toll and GDP losses due to the Civil War

	Category	Losses
Human capital		
i	Active population 1951	2,800,413
ii	Total battle deaths	43,452
iii	Seriously wounded (x2)	86,904
iv	Ex-patriated by KKE	55,881
v	Sentenced by Martial Courts 1946-51 to death or more than 10 years	48,489
vi	Displaced, annual avg 1947-49 Weighted to the 10-year period 3/10	279,740 83,922
	Total losses in human capital (ii to vi) As percent of active population [As in (i) adjusted by the losses]	318,648 **10.22%**
Industry		
vii	Factories destroyed	241
	As % of estimated capital stock	**15.76%**
Livestock		
ix	Livestock in 1940	14,945,396
	Destruction during 1946-49 As perecent of 1940 livestock	1,480,669 **9.91%**
Growth accounting		
	Estimated annual GDP loss	**12.25%**
	Retardation period 1946-55, years	10
	Total GDP loss discounted at 5%	**99.37%**

Note: Details of the calculation are given in Appendix B.
Data as follows:
i. ESYE (1951, Table 1, pp2-9).
iii. Seriously wounded estimated as twice the number of deaths..
iv.Papathanasiou (2002, p 147). Of those 17,352 were children, but accounted here as active population as most of them reached working age within a few years.
v.Michiotis (2007, p 235-239).
vi.Laiou (1987, p 71-72). Maximum number displaced in each year.
vii and x.As quoted in Rizospastis (2011, p 564), initial source unknown.
ix.ESYE (1939, Table B1, pp 123-124).

Table 5. DAG formations and regional allocation of persecutions

	Formation	Including nearby formations in	Distance from borders (km)	Regional shares of purges 1945-46	Allocation of martial courts prosecutions
1	Peloponnese		400		Patras, Tripoli, Corinth,Calamata
2	Evia		350	23% of FFE	Thiva
3	Parnassos	Vardousia Panetolikon	300	50% of FFE	Athens, Lamia/2, Mesologi/2
4	Othrys	Magnesia	250	27% of FFE	Lamia/2, Volos
5	Agrafa	Tzoumerka	200	Trikala,	Trikala
6	Pindos	Smolikas, Orliakas	50	Ioannina/2	Ioannina/2
7	Hasia	Antihasia,Koziakas,	150	50% of	Larissa/2
8	Olympos	Pieria, Ossa	150	50% of	Larissa/2
9	Vermion	Siniatsiko,Vourinos	100	50% of KGIP	Kozani/2
10	Grammos		1	Ioannina/2	Ioannina/2
11	Vitsi		30	Kastoria/2,	Kastoria/2
12	Kaimktsalan	Paikon	50	50% of KGIP	Kozani/2,Veria
13	Belles	Korona, Krousia	1		Kilkis
14	Halkidiki	Kerdylia,Pangaion	100		Thessaloniki/2
15	Serres	Orvilos	1		Serres,
16	Haidu	Boz-Dag	1		Drama
17	Thrace	Vyrsini, Sapka	50		Xanthi,
18	Lesvos		300		Mytilini/2
19	Hania	Lefka Ori	800		Hania
20	Cephalonia	Enos	400		Mesologi/2
21	Samos	Icaria	500		Mytilini/2

Notes: FFE is the area of Fthiotis, Fokis and Evia. Weights are proportions of regional populations to the total population of Sterea (excluding Attica), according to the Census 1951.
KGIP refers to the total of Kozani, Grevena, Imathia and Pella.

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