The emergence of democracy: a behavioural perspective

Kyriazis, Nicholas and Metaxas, Theodore

University of Thessaly, Greece, Department of Economics

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The emergence of democracy: a behavioural perspective

NICHOLAS KYRIAZIS[*]

THEODORE METAXAS [**]

In the present essay we introduce in a model the concept of macroculture and the formation of new values within the particular macroculture that arose during the 8th to 4th century BC in Ancient Greece. We analyse the conditions and the context for the emergence of the heavy infantryman, the hoplite, and the new tactical formation, the phalanx, and the trireme warship. We apply the coordination and cooperation as behavioural mechanisms to the phalanx and the triremes to show how a specific set of new values emerged. Then, taking into account bounded rationality, as a second behavioural mechanism we analyse how these values were taken over from the military into the political field and thus were crucial for the emergence and development of democracy.

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Jel Codes: N4, N43, B15

The emergence of democracy in general and direct democracy in particular in Ancient Greece, has raised considerable interest among political scientists, historians and more recently also economists. Economists have proposed new perspectives, in particular by using New Institutional Economics. North and Weingast (1989) for example link political transitions, and thus also the transition from older political regimes such as empires, kingdoms or oligarchies ("tyrannies" in ancient Greek terminology) to democracy, to the issue of credible commitment.[1]

Acemoglou and Robinson (2000 and 2006), Fleck and Hansen (2006) for ancient Athens argue that elites, when threatened by revolution from below, will sometimes choose to

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[*] Nicholas Kyriazis is Professor at the Economics Department, University of Thessaly. PC: 38333, Korai 43 Street, Volos (Greece), (nkyr@ergoman.gr).
[**] Theodore Metaxas is lecturer at the same department, (metaxas@uth.gr).
[1] For a critical appraisal of their thesis, see Daunton (2010).

democratize because promises of economic concession are not credible (in the sense that they may be revoked by the elite) while an institutional change, eg. the introduction of democratic rules of government, transferring part of the power to a middle class or the mass are more credible and less transitory, thus giving them also secure property rights.

Acemoglou and Robinson's thesis is open to criticism, because, the issue of "sometimes" eg, why is the outcome sometimes credible commitment through democracy, and sometimes not, leading to revolution and upheavals? (Daunton (2010). Democratization came in many historical cases through revolutions and not through a willingness of the ruling elites to give away some of their power and prerogatives. This happened for example in ancient Athens in 510-507 BC, in England with the somewhat blurred Glorious Revolution of 1689, that introduced permanent Parliament sessions and in France in 1789. Also, the theory of credible commitment has some difficulty in accommodating the emergence of democracy in new states after a successful war of independence against foreign rule, such as the American Revolution of 1775-1784, the Greek revolt against Ottoman rule in 1821, or the Latin American revolution against Spanish rule in the 1820's. Regimes may have tried to undertake reforms, which may not have been credible, bringing about revolution. If we accept de Tocqueville (1856, 1967), the French "Ancien Regime" of Louis XVI tried to do this, but the reforms undertaken were not credible, leading to the revolution of 1789.

Further, credible commitment by the elites presupposes first a real shift of power from the elites to some other group, because only then is the treat of revolution credible. This again presupposes a consciousness, among members of the other group(s) of their new found strength, and their organisation in order to solve the coordination and cooperation problem that must be solved to achieve either a credible threat, or actual revolution. Second, "credible commitment" by the elites presupposes the "foresight" by them that if they do not democratize, they will suffer a "total" (as against a "partial") loss of their privileges, and their willingness to forgo these privileges. In many instances, history shows that ruling elites lack both, as seen again recently in the cases of Sadam Hussein, Ben Ali, Hosni Mubarak and Moamar Gaddafi.

Lastly, infighting among elites, leading according to the Acemoglou and Robinson thesis some of them to look for support among non-elite groups, was a common enough occurrence, attested for example already in ancient China (Yates 1999) and Japan (Wayne-Farris 1999) but in most cases this did not lead to credible commitment but to authoritarian forms of government, a strong centralised empire in China, or the "shogunate" in Japan.

In the present essay we take a different approach trying to bridge some chronological and analytical gaps. We show why and how power shifted in our case study in ancient Greece and Athens from the Bronze to the Archaic Age, making the threat of revolution against the older aristocratic ruling elites credible, and in the case of Athens bringing about a democratic revolution, followed later on also by other city-states. For this, we focus on the new heavy infantryman, the "hoplite" and the new military formation, the "phalanx", as coordination and cooperation mechanisms that maximized battle efficiency and survival probability, but also even more importantly, shaped new particular values. Naval power, acquired by some city-states, Athens foremost after 482 BC, under particular historic conditions developed even more and fine-tuned the coordination and cooperation mechanisms that arose in the phalanx and the respective values.

We then argue that, due to bounded rationality, the coordination and cooperation mechanisms that arose due to military necessity and the values linked to them were taken over in the political field, because their efficiency in problem solving had already been demonstrated. Thus, we propose a new behavioural explanation of why democracy emerged, in ancient Greece and Athens, by the introduction of the analytical concepts of macroculture, coordination and cooperation mechanisms and bounded rationality.

The essay is organised as follows: First, we review the literature on coordination and cooperation mechanisms and macroculture in organisation theory and its relevance in explaining political change. Then we introduce a model of the emergence of a new macroculture that makes democracy a possibility. Next we analyse the emergence of the hoplite and the phalanx, and further on the trireme warship and naval power, as a crucial element of the new macroculture, followed by the examination of the values linked to them. Lastly, we apply bounded rationality to analyse the diffusion of the coordination and cooperation mechanism and the related values from the military to the political field, that make the emergence and development of democracy a possibility.

COORDINATION AND COOPERATION MECHANISMS AND THE EMERGENCE OF MACROCULTURES

There exists a substantial and growing literature on coordination and cooperation mechanisms, mainly in the fields of organisation and game theory, as the brief following review shows.

Coordination and cooperation mechanisms appear in many areas of human activity, as means to facilitate exchange, lower transaction costs linked to such exchanges and in developing trust among participants in such voluntary exchanges, both in markets, but also within organizations and firms.

Authors emphasize the role of trust, creation of common information and expectations and the emergence of common values and norms. These again lower transaction costs and enable organisations and societies to achieve Pareto superior outcomes (e.g. Xu and Beamon, 2006; Fink and Kessler, 2010; Adler, 2001; Kale, Dyer and Singh, 2002; Malone and Crowson 1994; Manzini, Sadrieh and Vriend, 2009; Coleman, 1990; Arrow, 1974; Fukuyama, 1995; La Porta et.al., 1997; Kramer, 1999; Myatt and Wallace, 2009; Hellwig and Veldkamp, 2009; Dewan and Myatt, 2008; Falk et.al.,2010). Other authors focus on the coordination function of leadership (Van Vugt, 2006; Hogan et.al., 1994; Aidas, 1989; Hollander, 1985) and of network governance (Jones et.al., 1997).

We now turn to a brief review of the issue of macroculture in organisation theory. A macroculture encompasses the common values, norms and beliefs shared among members of a group, for example an enterprise or organisation, or a group of firms in a specific market, while firms and organisations can be seen as coordination mechanisms, being composed of parts (eg. their sub-groups etc) and also characterised by the specific ways in which the parts are arranged macrocultures evolve through the interaction of firms and organisations among themselves. Macrocultures thus guide actions and create typical behaviour among independent but interdependent entities, so that they coordinate their activities so that complex tasks may be completed (Jones et al. 1997, Abrahamson and Fombrun 1992, 1994). This happens in three ways: 1) by creating "convergence of expectations", 2) by allowing for idiosyncratic language to summarise complex routines, and information and 3) by specifying broad, tacitly understood rules for appropriate actions under unspecified contingencies (Williamson 1975 and 1991, Camerer and Vepsalainen 1988). The establishment of "communication protocols" follows. This again leads to "structural embeddedness", that is the connection of mutual contacts one to another (Granovetter 1992, p. 35). Structural embeddedness[2] corresponds to the establishment of mutual links or networks. These

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[2] The discussion of embeddedness is much older in the historical than in the organisational context. (Amemiya 2007, chapter 5, 57-61, Morris 1994; Finley, 1982; Polanyi, 1957).

interactions diffuse values and norms and thus strengthen, through this interdependence, the macroculture.

The issue of coordination and cooperation has been addressed, but we believe somewhat in passing, in political science, as for example in Almond and Verba (1963 p. 357) who state that social trust facilitates political cooperation in stable democracies and that without it, democratic politics is impossible. Further on in our analysis, we turn this issue on its "chronological head", showing how specific coordination and cooperation mechanisms, the phalanx and the trireme develop trust in the military field, which is taken over then in democratic politics.

In the following section we introduce a model of the emergence and development of macrocultures in societies and states, as a long-term cultural frame of norms, values, customs and beliefs.

A MODEL OF THE EMERGENCE OF MACROCULTURES

In figure 1 we represent a development in time, where the different elements (given as cycles) of a macroculture, (eg. warfare, religion, athletics, city-state environment, economy and property rights) arise in different areas (during time period 1 to 2), are progressive by mutually reinforcing each other (period 2 to 3) and finally are integrated into a new macroculture at period 4. During the same time period, the values and norms that emerge and characterise each element (in each cycle) may be diffused into another element of the macroculture. As we will analyse in our case study, the new values and norms that arise in warfare (say, cycle 1 in the figure) are connected to the working of a specific coordination and cooperation mechanism. The "diffusion" mechanism can be explained by bounded rationality (which we analyse in more detail later on), which becomes the mechanism or "glue" that binds all elements into one "coherent whole" at concluding time period 4 in the figure.

(…………………………Figure1 about here……………………………………..)

In figure 2 we represent the same idea at a macroculture level, to show how over time a society or city-state in our case study, changes from an old to a new macroculture, which in the field of politics is a departure from an absolutist regime (kingship or aristocratic) into a democracy.

(……………….…………Figure2 about here………………………………………..)

om: signifies the old macroculture, a system of norms, values, customs etc. that characterise the economic, social and political field of a state, and its associated institutions, laws and organisations.

nm: is the emerging new macroculture, where new norms, values, customs etc are being created developed and diffused, so that over time a break with the old path-macroculture is accomplished and the state follows a new (in our case democratic) path. During each period the state follows the new path nm, the probability of staying on this path increases and the probability of returning to the old path decreases, as given by table 1. This is due to i) during each subsequent step along the new path the various elements of the new macroculture are being mutually reinforced and integrated into a whole, representing the acquisition of new knowledge for the society-state and ii) the new knowledge requires a collective investment of effort, time etc. for its acquisition. Were the stat-society to revert to the old path, this effort and investment would be lost.

The conceptual framework presented in figure 2 can also be described by Table 1, which shows the conditional probabilities p_{n1}, p_{n2}………p_nt, that characterize each step along the new macroculture regime depending on the result of the previous period, and 1-p_{n1}, 1-p_{n2},….1-p_{nt} the probabilities of a return to the old macroculture regime. Based on the previous analysis we have:

$$p_{n1} < p_{n2} < \cdots\cdots < p_{nt-1} < p_{nt} \qquad (1)$$

$$1-p_{n1} > 1-p_{n2} > \ldots > 1-p_{nt-1} > 1-p_{nt} \qquad (2)$$

(1) and (2) have a logical explanation. For instance, $p_{n1} < p_{n2}.$ This is valid because, as we have shown in Figure 1, when during each period the state follows the new path (nm), the probability of staying into the new path (e.g. p_{n2}) increases and is higher than the previous probability (e.g. p_{n1}). So, it is clear that over time the probability of going back to the old macroculture (1-p_{nt}) converges towards zero.

(…………………….……….…….Table 1 about here……………………….…………)

In economic terminology, the acquisition of new knowledge along the time path, becomes "sunk cost" as realised investment, that increases along each period of the path, so that the potential loss through reverting to the old path also increases over time.

The model can be formalised by two simple equations:

1. $m = a + om + nm \cdot e^{g_t \cdot t}$

Where g_t is the rate of change depending on the creation of new elements of macroculture and their speed of diffusion (adaptation by other sectors). It is clear that over time the exponential term $e^{g_t \cdot t}$ predominates over the equation 1, bringing the state along the new path nm of figure 2.

2. $g_t = f(\tau, d)$

where:

τ: knowledge

d: rate of diffusion (of the macroculture effect)

The rate of change g_t is a function (it is not necessary to specify it further, requiring only that the influence of τ and d on g_t is positive) of the creation of new knowledge τ (eg. the new values and norms associated with each cycle which lead to new organisations etc) and its rate of diffusion d from one element of the macroculture into the others. In our case study, the new values and norms are associated with the new military organisation forms, the phalanx and the trireme.

So, the ultimate format of the macroculture equation might be:

$$m = om + nm \cdot e^{f(\tau, d) \cdot t} \qquad (3)$$

Simon (1982, 1983, chapter 3, 1991) developed the theory of bounded rationality as a behavioural explanation of choice, which has been adapted and refined with variations by many authors (eg Clark 1977, Williamson 1991). Bounded rationality states that the mind has limitations for example in its capacity to absorb and use new information. We are not "totally" rational in the sense of seeking to maximize utility or any other "ideal". What we actually do in real life is to try to reach a solution that satisfies us, even of it is not the best possible one. We may even ignore the best possible one that would maximize utility. Simon

calls this behaviour "satisficing". Satisficing enables us to find acceptable solutions with minimal expenditure of effort and time, thus reducing transaction costs, which are the costs necessary to gather information, draft legal documents etc.

Such behaviour has further consequences: Once we have found solutions to a particular problem that are perceived as adequate, when facing a new problem, we try to use the established and known "rules of the game", the known knowledge we possess, in order to solve the new problem. This again reduces our effort and time consumed, which is important due to our brain's capacity limitation. Only if we do not find an adequate solution using the existing knowledge and if the problem we face is serious enough, do we devote effort and time to find new solutions. Once we have found some, we have increased our total learning and knowledge. Satisficing behaviour thus diffuses known solutions and problem-solving rules to new practical.

In our model's adaptation of bounded rationality, it becomes a behavioural mechanism, a channel for the transportation and transformation of ideas, norms, values, customs that have emerged in one area of a macroculture, into the other areas. Thus, τ in equation 2 is the creation of new knowledge if no adequate solutions can be found under the "old rules of the game", while d is the diffusion mechanism due to bounded rationality, that transports the ideas etc. from the area (say the military cycle 1) into others (eg., the political area). As time passes, bounded rationality becomes a kind of "cognitive glue" that holds the various elements of a macroculture together and integrates them into a whole, (as pictured by the last phase in figure 1).

We know turn to our case study of the emergence of democracy in ancient Greece and Athens. We want to underline that we propose a multicausal explanation, as made clear in the above model, but due to space limitations and to the fact that the other causes of influence have been analysed (Kyriazis and Economou 2012a and b, Kyriazis, 2012; Raaflaub 2007, Hanson 1995), we will concentrate on the military aspect of the emergence of the macroculture and its influence on politics and democracy.

THE EMERGENCE OF THE HOPLITE AND THE PHALANX

After the fall of the Mycenaean centrally steered palace economy (about 1200 BC) where a major part of production, in particular metal (bronze and gold) working took place in the palace itself, central authority was weakened in the emerging city-states, which were more

numerous and on the average much smaller than the preceding Mycenaean ones.[3] This brought about a change in the issue of who would provide defence in a dangerous world of constant threat and warfare, a task entrusted mainly to the heavily armoured elite warriors during Mycenaean times.   Due to the new conditions after the fall of the Mycenaean world (economic recession, fall of living conditions and state fragmentation) this was no longer a possibility during the so-called "Early Iron Age" (EIA) period. Thus, new solutions had to be found: The new solution was for the farmers to arm themselves in the easiest and cheapest way possible, by home produced arms. This brought about a shift of power from the elites to the wealthier farmers, who by the end of EIA probably, and certainly by the end of the 8th century had developed into the hoplite warrior, history's first heavy infantryman to appear in significant numbers on the battlefields.[4]

Thus, the weakening of the central state made finding new solutions for defence an absolute necessity and this gave rise to the hoplite, who financed his weapons himself, and

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[3] During the Mycenaean period these were a maximum of about 100 states, while during the Archaic and Classical period there were 1035 (Hansen 2006) of which at least 700 were situated in mainland Greece and of them, again, the majority in the regions previously covered by the Mycenaean culture, i.e. we have about five archaic city-states for every single Mycenaean state.

[4] The elite Mycenaean warriors were armed by "Dendra" type armour (a complete set was discovered in a tomb at Dendra in Argolis) which made them almost invulnerable in battle to stone, arrows, spears etc. and set them apart from the poorly armed common people warriors. They wielded long swords, so that their arms and armour made them look like late 13-14th century knights. Their armament was very expensive, and could not be produced after the fall of the palace economy. We do not deny that other ancient armies like the Egyptian New Kingdom, the Assyrians and the Chinese fought in tactical formations. What we emphasise is that other ancient warriors were i) Not as heavily armoured as the hoplites. Looking at the evidence (as collected by Healy (1991) for the Assyrians and Persians (1995) for the ancient Chinese armies, the differences stand out: Assyrians and Chinese wear, if at all, only lamellar armour for torso front and back, helmets that cover only the top of the head and leaving the face unprotected, no greaves, and most important, small and one grip shields, that do not protect the warrior standing to their left. ii) They did not finance their arms themselves. iii) The phalanx was a more compact formation.

thus brought about a shift of power from the older aristocratic elites to the new "middle-class" hoplite-farmers (Kyriazis and Paparigopoulos, 2011, 2012).

We turn now to the analysis of the phalanx as a coordination and cooperation mechanism. During the transition period from the fall of the Mycenaean culture to the beginning of the Archaic Age, when defensive armament was rudimentary for most (eg., the provision of a "home-made" shield) casualties in a "mixing" type of battle, like those described by Homer, must have been high. New tactical formations must have been tried and adapted gradually, through trial in battle. Obviously the best in the sense of battle winning and survival probability enhancing, were kept, the inadequate ones being discarded. The best solution to emerge was the phalanx formation, which was complete by the mid-7th century BC.[5]

In the phalanx, each warrior stood next to the other, covering with his shield not only his own front, but also the right (unprotected) spear side of the warrior next to him, and so on. Thus the phalanx offered a united front of shields and protruding spears, held usually high above the elbow, and striking in combat downwards, attempting to hit the enemy over his shield. This solution offered protection to the vulnerable flanks of the warriors. In order to protect also the vulnerable rear, a deep order (of usually eight ranks) was adopted. The warrior behind each one protected the rear of the one in front. Thus, the phalanx got strength due to its great depth. By choosing adequate places to offer battle (usually small level plains) the flanks and the rear of the phalanx could not be assaulted. Phalanx combat was usually frontal combat, where endurance and strength were the decisive battle winning elements. Numbers too were important. For the first time during the Archaic Age and later on, substantial numbers of equally armed men appeared on the battlefield.

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[5] The emergence of the phalanx can be followed in painting and writing. A particularly fine example of pottery painting depicting a phalanx is the mid-7th century Corinthian "aryballos" (a wine jug) called the Chigi Vase, preserved in Villa Giulia, in Rome. Homer, in the Iliad, when describing Achilles companions, the Myrmidons (Il. 6. 212-217) writes that in their close formation they resemble a tight wall. We must recall, that although writing about the Trojan War (of about 1250 BC, if historical at all) Homer described often his own times, the 8th century. Thus, the above mentioned text we believe is a description of an early phalanx formation. For different interpretations of Homeric fighting see van Wees (2004) and Raaflaub (2008).

By the 7th century, due to a revival of economic activity, arms and armour had also been refined. The simple wooden shield became convex and a second grip for the hand (antilabé) was added, making the "hoplon" (shield), which gave its name to the bearer, the hoplite, easier to handle. Bronze armour for the front and rear torso was introduced as well as bronze greaves and bronze, mainly Corinthian-type, helmets, which left slits only for the eyes and nose, thus offering all round protection for the head, but restricted view and hearing, thus making the phalanx formation even more of a necessity. [6]

From the description of the phalanx it becomes clear that it necessitated strict physical coordination, in order to preserve its compact appearance, its aligned front, and its strength in thrust. The hoplites had to train constantly in order to achieve the above, to be able to walk at the same speed and be able to execute necessary manoeuvres on the battlefield.[7] Spartan phalanxes certainly (Sekunda 1998), and other city-states phalanxes possibly, introduced drums and flutes in order to help with their music the keeping of step in the phalanx. Phalanxes could and did when necessary change front in battle, at all times a difficult manoeuvre, but performed many times successfully by Spartan phalanxes, the Thebans at Leuctra (371 BC) and Mantineia (362 BC) and most notably and with devastating success by the Athenians against the Persians at Marathon (490 BC) when the victorious Athenian flanks wheeled inwards, entrapping the Persian centre (Her., 6.94-140, Burn (1962 and 1984) Warry (1980)).

Thus, through training and battle, the phalanx became one advanced and fine-tuned coordination and cooperation mechanism. Constant physical training, coordination and cooperation gave rise also to a "mental" coordination, a common attitude in combat. Upon cooperation among the hoplites and their officers (in some democracies, as in Athens after

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[6] For the evolution of Greek arms and armour see Hanson (1989), Sekunda (1998, 1986), Warry (1970), Connolby (1977).

[7] Ancient authors give scant information on training, probably because they considered that it was unnecessary with their readers and hearers who must have been thoroughly familiar with this aspect of the phalanx. Still, some authors (Plato, "Republic". 374d and "Laches"), Xenophon "Lac. Pol". 11.5-10, Aristotle "Pol". 1297β17, Thucydides "Hist." 5.70, Plutarch "Mor". 193c) give useful hints on the importance of training. In Kyriazis and Paparrigopoulos (2012) we analyse this issue in detail.

507 BC, elected by the Assembly) depended the winning of battles and survival, the efficiency of the phalanx. It was also cooperation towards the achievement of common ideals and goals, supreme and ultimate in some cases, namely such as the safeguarding of the city-state's independence and, on some decisive occasions like Marathon (490 BC) and Plataea (479 BC), the safeguarding of a democratic form of government and a particular way of life.[8]

The phalanx developed a material payoff structure (Falk et al. 2010), with very strong social interaction effects. The payoffs were, on the individual level, survival probability, and the phalanx evolved on the battlefield as the tactical formation that maximized this probability. On the social or group level, the payoffs were the victory probability and what this meant for the city-state in material and non material gains, such as loss or gain of territory, loss of independence and possibility of enslavement of the inhabitants, glory, prestige etc. Due to the very high payoff values at both the personal and the social level the phalanx was a maximum effort coordination and cooperation situation (van Huyck et al. 1990). The phalanx and the "trireme" warship incorporated very efficient incentives for coordination and cooperation: high positive payoffs linked to high negative ones (disincentives) for non-compliance: The cost of mis-coordination and non-cooperation was almost prohibitive, leading to a high probability of loss of life and material loss at the city-state level.

The phalanx solved also effectively in most cases the "free-rider" or shirking problem, which has been recognized as an important mis-coordination problem, due to selfish motivation by some (or all) participants in organisation (Falk et al. 2010). Monitoring by "neighbours" ie. the hoplites in front, behind and on the two sides was easy. For all except the rear rank, due to its close order formation, the possibility of defection from the phalanx was nonexistent. Only the rear ranks could "defect" (run away from battle), and a phalanx rout, if it happened, happened in inverse order: First, the rear ranks broke away, permitting thus the disengagement of the next (rear rank) to break away and so on.

Even more so, shirking among ships' rowers was also easy to monitor, and the possibility was non-existent in a naval battle, unless the captain gave such an order and the crew accepted it, an extremely rare event in Greek naval history. So, the external conditions

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[8] We are of course aware, as will become clear later on, that also oligarchies and even tyrannies, did field hoplite armies. This is why we consider the phalanx a necessary but no sufficient condition for the emergence of democracy.

of the "battle-game" influenced also the motivation of the participants, exhibiting very strong "reciprocity" and "conformism" that led to cooperation (Sugden, 1984; Alpizar et al. 2008).

THE TRIREMES AND NAVAL WARFARE

The naval vessel that was introduced in Greek navies by the beginning of the 5th century was the trireme ("trieres" in Greek) adopted and developed perhaps from an earlier Phoenician design. She was a 50 ton wooden vessel, propelled by 170 oars and oarsmen on three level, (thus its name) and in favourable wind conditions under two or three sails. Additionally, a trireme carried 10 hoplites as marines, 10 sailors, 3-4 archers and 7 officers for a total crew of 200 (Morrison and Coates 1986).

The trireme was a mechanism composed of different "parts" (the various specialties and tasks assigned to the various groups of men that crewed her). These "parts" were arranged in specific ways so as to maximize battle efficiency.

The trireme, even more than the phalanx, required intense coordination of effort. First, the 170 oarsmen, seated on three levels, and with different length oars (due to the different height of the 3rd (highest) level from the sea surface) had to learn to row together and perform various tasks for the ship, such as different speeds for endurance and cruise, or attack, (ramming) change of direction (one side of the ship's oars forward, the other backwards) and disengaging after a successful ramming (both sides backwards, the Greek command being "Ανακροῦσε"). This physical coordination was facilitated by the beating of a drum, or a fife, at different rhythms by the "Keleustes" (an officer, the Greek word meaning "he who commands") and by various other command words[9] (like "πρόσω", forward).

But even more, at a second level, the trireme required intense coordination and cooperation among the different types of specialists: oarsmen, marines, sailors, archers and officers, such as the keleustes, the steersman, the navigation specialist "naukleros" and the "trierarch", commander of the ship, who was not necessarily a specialist, but a rich Athenian liable to undertake the liturgy of trierarchy. Under this, he financed the ship's running expenses for a year (usually 8 months of operations since triremes did not operate in winter) and command it (Gabrielsen 1994, Kyriazis and Zouboulakis 2004).

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[9] Greek ships, like Roman ones (Roth 2009, p. 32, d' Amato 2009, p.11) were oared by free citizens. Only in very few cases of acute shortage of citizens (like at Arginusae, 406 BC) were slaves used as rowers, but even then, they were freed after the battle.

A well-run trireme worked thus like a well turned orchestra, in which different musical instruments playing sometimes different tunes produce one melody. But what we think was even more important for the deepening of democracy, was that the trireme was a school of cooperation among equals at the first level (like the phalanx) the rowers coming all from the least prosperous class of citizens, the "thetes" at least in Athens, for which we have sufficient information.

At another level, it became a school of cooperation among social unequals, that is, the poor rowers, the "middle class" hoplite marines, the specialist ("middle-class"?) sailors, and the "upper class" officers, among them the trierarch who always had to be a very rich man to be able to afford the cost of this liturgy. [10]At a third level, intense coordination and cooperation were required for fleets to perform victoriously as a whole, executing successful battle plans and manoeuvres and outflanking and outperforming enemy fleets. Greek fleets were relatively large, for example 368 ships and 73.600 men at Salamis (480 BC)[11], 155 Athenian and allied ships against 120 Spartan and allied at Arginusae (406 BC), and 82 Athenian against 70 Peloponnesian ships at Naxos (376 BC).

Successful coordination and cooperation reduce transaction costs and promote efficiency and the phalanxes and the triremes did just that. The aim was to minimize the possibility of error and time taken to action, to translate decision into action in "real" time, a decisive factor for winning battles throughout history. They achieved this by continuous exercise and training but also by developing a specific communications language, a set of signals and commands that corresponded to specific actions to be taken each time.[12] These signals and commands had to be short and clear. The specific language evolved was a further element of the coordination and cooperation mechanism, as in modern organisations. If we pursue the analogy further, the "trierarch" (commander) and "naukleros" (navigation expert) come very close to a modern firm's or organisation's manager.

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[10] The cost of trierarchy could vary from about 3.000 to 6.000 drachma when a day's remuneration for a skilled artisan and worker at the Acropolis in the later 5th century was one drachma (Gabrielsen 1994, Kyriazis 2009).

[11] Not including 14 older 50 oared ships called "penteconters"

[12] Examples are "πρόσω" (forward), "ανάκρουσε" (backwards), "εμβολή" (ramming), "βάδειν" (walking), "τροχάδειν" (running).

Coordination and cooperation mechanisms involve learning. First, learning of specific technical skills, eg. how to march united, to wield the shield, the spear, the sword, to push, to row, to set the sails etc. Second, to master the communications techniques and the "language". Third, and for the development of democracy most important, learning to cooperate towards the fulfilment of a common purpose, to listen to the advice (command, in battle) of the expert and "learn" and adopt new values. We now turn to an analysis of the new values that the phalanx and the triremes as coordination and cooperation mechanisms inculcated into their participants.

A NEW VALUE SYSTEM

The importance of norms, customs, values and institutions for economic performance has been recognized widely by the classical economists and brought into focus again by the new institutional economics, as exemplified by North (1978, 1981, 1984, 1990, 1994).

Post-World War II literature on modern democracies studies also the relationship between culture and democracy, emphasizing the role of values in the emergence and durability of democracy (Almond and Verba 1963, Dahl 1966, Huntington 1968). Some authors (eg. O'Donnell and Schmitter 1986) have analysed pacts and agreements among competing elites that initiate a transition to democracy. Weingast's (1997) approach implies that democracy is in part a coordination problem among citizens, because they have to agree on the limits on the state that they are to defend. Self-enforcing limits on the state result – when the citizens resolve this coordination issue. Elites construct solutions to the coordination problem, often through pacts with not-elite citizens, which results in a set of mass behaviour that creates a "civic culture".

The first value to arise in the ranks of the phalanx was self-consciousness of the hoplites. As they became aware of their strength and tested their resilience in battle, a revolutionary idea for that period took form and root: Not kings, like the Divine Pharaoh of Egypt, or the vice-regent on earth of the God Ahura Mazda, the Persian King of Kings, or even Kings said to be descended from demigods of Greek mythology, embodied the state, but they themselves, the "demos" the people. (Or, to be more precise, the part of the people who had the economics means to afford the hoplite equipment and the time needed to train in the phalanx).

The phalanx was characterised by cohesion, common purpose and will, the hoplites being almost physically "glued together".[13] All hoplites, from the general(s), through the officers, to the common hoplite, were equal and inter-dependent. Each hoplite depended on and trusted his life to the ones standing next to him, covering his unprotected flank and rear. This trust and dependence both presuppose and generate equality. Like all efficient coordination and cooperation mechanisms, the phalanx required great discipline and obedience to the commands of the general(s) – the coordinators, given through the particular communication language and signals developed.

The values evolved in the phalanx applied also, and stronger, to the triremes. The important point here is that the triremes "team" was not a homogeneous one (from the point of view of armament and economic – social background, as the hoplites were) but a diversified one. Common values extended now to all the crew-members, the rowers (poorer citizens who were excluded from the phalanx lacking the means to equip themselves and the time needed to devote to training), the marine-hoplites, sailors, archers and specialists-officers. As Hanson (1996) points out, landowning hoplites and "upper-class" officers were transported by, then fought alongside with their social inferiors, blurring traditional census rubrics and cementing the notion of political equality, as the shared experience of danger offered by military service so often does, as recognized already by Aristotle. (Pol. 6.1321 α 17-19). Strauss (1996 p. 313 and 316) writes that service in the fleet ignited the "thetes" (the lowest-poorest census class in Athens) political consciousness by offering them a practical education, and the symbolic, emotive and ritual dimensions of the triremes have much to say about the character of Athenian democracy.

In particular, trust, emerged as the supreme value of the phalanx, on which its cohesion depended, and on the ships and fleets, on which their efficiency depended.

In modern terminology, trust created "safe" predictions as to what others would do in particular circumstances, in battle, either on land or at sea. Thus endogenous uncertainty which arises in situations where the outcome depends on social interaction (Heinemann et al.

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[13] Demades, a 4th-century Athenian orator described "theorika" (payment to citizens to enable them to watch the theatrical plays) as the "glue of the democracy" (Plut. Mor. 1011β). We suggest that the phalanx became the "glue of proto-democracy".

2004) was almost eliminated. The extension of military service and the associated emerging value system were preconditions for the emergence of ancient direct democracy.[14]

We have so far analysed the values evolved in the phalanx and on the ships, trust being the supreme one. We now turn to the analysis of the emergence and development of a macroculture associated with these values, that made for the first time in history the emergence of democracy a possibility.

Our argument consist of two parts: First, due to the working of bounded rationality, the values and norms developed in the phalanx and on the ships creating a specific military macroculture were transferred into the political field. Second they became, as a result of military coordination and cooperation mechanisms the basis of a political coordination and cooperation mechanism. This again solved the general coordination and cooperation problem that had to be addressed for democracy to emerge, giving substance to the shift of power, to the threat of revolution to the ruling elites, forcing them in some cases to commit themselves credibly to reform. In many instances during the 6th century BC in Greece, this reform took the form of "isonomia", equality in front of the law, the strengthening of property rights, mainly ownership of land which could not be expropriated or interfered with (Birgalias 2009). In Athens in particular, through Solon reforms, debts were abolished and citizens could no more be seized and enslaved for outstanding debt, thus establishing an unalienated right of personal freedom for citizens (de Ste. Croix 2004, chapter 2).

In other cases revolutions actually happened and through them in some instances democracies were introduced in some city-states (Forrest 1966, Burn 1960, 1962). Athens is a "mixed" case, where Cleisthenes first introduced democratic reforms (510 BC), wanting to reinforce his position against other aristocratic elite families (according to Raaflaub et al. 2007). Then, (507 BC) democracy had to be validated against internal threats, an oligarchic coup d'état, and external invasions by the Peloponnesians supporting them. A spontaneous revolution happened and safeguarded the democratic reforms introduced by Cleisthenes.

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[14] A point recognized already by Aristotle who wrote: "when however, states began to increase in size and infantry forces acquired a greater degree of strength, more persons were admitted to the enjoyment of political rights" (Pol. 1297β 16-28) and taken over by Weber (1899 p. 1311): "The decisive criterion (for the voting right in the assembly) was initially the capacity to quip oneself for service in the hoplite infantry".

Thus, our answer thus far, as to the emergence of democracy, is that there was a real shift of power from the elites to the hoplites, entailing a potential and often realised threat of revolution. Aristocratic elites in ancient Greek city-states did not just make a credible commitment to democracy in order to gain needed political support in their competition against other members of the elites. If they had not done it, democratic revolutions would have overthrown them.[15]

Self-consciousness in the military field gave rise to self-consciousness of potential political powers: If, together with your hoplite equals, you are dominant on the battlefield and the defender of your city-state, why would you accept being denied a say in political decision making? And who is strong enough to prohibit you from this participation, once the hoplites are conscious of this shift of power? And, at least, who is strong enough to interfere with your property rights, mainly in land and its produce? Obviously, the answer is "none" within the city-state itself. (Tyrants and aristocratic oligarchies did sometimes seek outside help or use foreign mercenaries).

The phalanx and the ships were characterised by cohesion, common will and purpose. These values were taken over into the field of politics: Through special procedures established over decades for decision-making, voting in the Assembly and the courts of justice and the use of the lot for most positions of "state-administration", citizens developed a common purpose and will for the city itself. We argue that election by lot arose out of the equality reigning in the phalanxes' ranks: What better expression of the equality principle in politics than letting chance decide who among equals should be selected for office?

We further believe, that this is a strong manifestation of bounded rationality: Equality of skill, strength, valour etc. were more or less established in the phalanxes' ranks, since presumably those not up to the strict phalanxes' exigencies would have been excluded from

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[15] Hoplites supported tyrants against the older ruling aristocracies in many 7th and 6th century city-states like Samos (Polycrates), Syracuse, (Gelon and Hyeron), Corinth, (Kypselos and Periander), Megara (Theagenes), Sikyon (Orthagoras) and Athens (Peisistratus), (Forrest 1966, Raaflaub et al. 2007). We lack information for the majority of Greek city-states during this period, but at least 19 democracies (and probably many more) are attested for the beginning of the 5th century BC.

its ranks. Once this equality was accepted, then the "cheapest" (in the sense of minimizing transaction costs, mainly information ones) rule for choice for political office was election by lot among "military equals" who were presumed to be also "politically equals", in the sense of possessing more or less the qualities required also for political offices. Thus, (time consuming and transaction costs increasing) rules and procedures were deemed not to be needed.[16]

Modern scholars (Horowitz 1985, Rabushka and Shepsle 1972, Weingast 1997) underline the importance of homogeneity as against divided societies for the establishment of durable democracies. Severely divided societies typically lack consensus, and "plural" societies are inherently prone to violent conflict.

The emergence of ancient democracy was based on the hoplites' socioeconomic homogeneity, although hoplites were a minority among citizens. This is why we argue that the emergence of the hoplites was a necessary but not a sufficient condition for democracy. If a city-state developed democracy, that depended also on particular circumstances, such as the existence of inspiring leaders, grave external threats, competition among the elites and symbolic events.[17] All these were present at the end of the 6th century in Athens, thus establishing a durable democracy after 510-507 BC. But what was more important for the durability and deepening of Athenian democracy is that the ships were a "school of democracy" in the sense of teaching coordination and cooperation and establishing common values to non homogeneous socioeconomic groups.

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[16] A few "specialist" administration positions were still filled by election and not by lot. These were in Athens the "ten generals", (each commanding one of the ten "regiments") combining also the office of the admiral (s) and, during the fourth century, the "tamias" (akin to a modern minister of finance). Positions covered by lot were the "bouleutai" (members of the council that prepared the agenda for the Assembly's meetings) the members (jurors) of the courts of justice, and after 477 BC the "eponymos archon", chosen for a year. He was the nominal head of the state (akin to a modern president) and among others he gave his name to the year.

[17] Pericles "Funeral Speech" has been a lasting inspiration for democracy's advocates, influencing among others Lincoln's Gettysburg Address (Merrill 2011).

The ships and the fleets were a microcosm of Athenian society, where the richest citizens (trierarch and officers) "middle-class" (marine-hoplites, "warrant officers" and sailors) and rowers (the poor "thetes") fought and campaigned together. Further, the establishment of maritime states, such as Athens and the island states of Samos, Chios and Rhodes (that flourished during the 4th and 3rd centuries BC) brought about a community of interests among all citizens, making thus for the durability of democracies.

In ancient Athens, all citizens felt that they benefited (although of course to different degrees) from the city's maritime activities (and, at least during the period 478-404 from what has been called the "Athenian empire" although the Athenians themselves never called it that).

Benefits were even extended to foreign free residents (metics) and even some categories of slaves, like the trusted assistants of bankers and those working on their own with their families ("slaves living apart") who gave a part of their produce to their masters and were entitled to the rest. They had incentives like being granted freedom, and in a few cases even citizenship, to work well. Education promoted further the idea of a community of interest as well as religious festivals (Bitros and Karayannis 2008, 2010, Cohen 1997 and 2002).

The phalanx and the ships required great discipline. Battle discipline was transformed into political discipline: once everyone who wanted to speak had been heard, the Assembly voted. After the vote and the decision reached, it was binding on everyone, including those who might have disagreed. The same discipline manifested itself in the obedience of the laws by the citizens.[18]

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[18] Almond and Verba (1963, 372) write: "If a new nation is to create a civic culture... there must be a symbolic event, or a symbolic charismatic leader...". If such symbolic events and leaders for the American Revolution were the "Boston Tea Party", "Bunker Hill" and George Washington and for the French Revolution the storming of the Bastille on the 14th of July 1789, for Athenian democracy they were Cleisthenes and the besieging of the tyrant Hippias and his allies the invading Spartans under King Cleomenes I on the Acropolis, in the spontaneous revolution of 507 BC. It was a spontaneous revolution without a particular leader (Cleisthenes being then in exile) but we argue that this was possible, because at least the Athenian hoplites, the only part of citizenry able to face the Spartans in battle, had already solved the coordination and cooperation problem inherent in any revolution through the long hours of common training and exercises required by the phalanx.

The supreme ideal developed in the phalanx, and even more on triremes and the fleets was "homonoia" (concord, same mind, unanimity). Hoplites and the crews were very much aware that they belonged to a team, that victory and survival depended on the team. In modern terminology, they understood that the maximization of individual effort created positive externalities for everyone and that this was a positive sum game: If everyone maximized his battle effort, he stood a better personal chance (or probability) of surviving unharmed and of his team (phalanx and ship) gaining the collective prize, victory.

In peacetime, cooperation in a democracy is designed to take into account the interests of others, to be willing under some circumstances to compromise, thus achieving also in peacetime a positive outcome for everyone. "Homonoia" can be thus interpreted as the ideal of a positive sum game. This actually did happen in Athens through a community of interests and compromise among different interests in some specific cases.[19]

Thus the phalanx and the triremes created a community of interests, gave common motivation and provided common education. "Homonoia" became then the leading ideal in democracy, and decision-making in the Assembly was the expression of this common will, as already recognized and underlined by Aristoteles (Ar. Pol. 1264α 36-37). He wrote that education makes a city "common and one".

The combination of different skills in the operation of a trireme signalled a further important step for the working of democracy: As on the ship everybody had to listen and to obey the expert, thus, as citizens, the Athenians applied their military experience to the Assembly. They learned to listen and to be guided by the experts. Indeed, they acquired two very important types of knowledge and education: first the combination of nautical skills into a unified whole and, second, the general idea that some people were the experts and that it made sense to listen and be guided by them. This "being guided by the expert" was one of the

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[19] Aristotle (Ath. Pol.) had already recognized that maritime states were more democratic than land based ones. That maritime states create a community of interests has been proposed by Glete (1993) and developed by Rodger (1997) and Kyriazis (2006). In early modern times maritime states such as the United Provinces, England and the United States in the 17th and 18th centuries, although not yet full democracies, were more democratic than any other contemporary state, with the exception of Switzerland. But, on the other hand, Switzerland was a "hoplite-democracy", and Swiss medieval and Renaissance pike formations were similar to ancient Greek phalanxes, as explicitly recognized already by Oman (1885).

most valuable lessons learned from service on ships, on which the efficient running, the duration and the stability of the Athenian democracy were based.

Another important point learned on the ships was a "fine-tuning" between equality in political rights combined with a recognition of inequality of natural ability and talent. Listening to the advice and obeying the orders of the expert(s) presupposes that their special and different ability and talent is accepted and respected. Taken over in the Assembly, every citizen had the right to speak, to propose and to vote, but the majority did not speak and propose, but listened to the experts and voted in accordance to those arguments that convinced them.

Thus Athenian political culture was influenced to a high degree by its naval military culture. The shared experience, the bonds of trust and common purpose generated onboard the ships worked also as an "encompassing glue of democracy". On board a ship, the poor rowers became well acquainted with the hoplites and the wealthy commanders in a way that they would never have had the opportunity to acquire in their "civilian" life.

The working of bounded rationality also influenced political life in another way, in the choice of political leaders (in the special cases in which they were not elected by lot) and proposals put to vote in the Assembly. Once citizens became acquainted with a military leader who was successful in battle, they trusted him and were prepared to listen to his proposals and be convinced also in "political life".

They transferred their military trust to their political trust of the same man, because this saved them transaction costs of finding "new solutions" (new men), acquiring information about an unknown man (concerning his level of expertise, intelligence, character etc). They were then usually ready to accept him as long as he did not make any serious mistakes, or the circumstances did not dramatically change later. Further to this, since a major part of proposals in the Assembly concerned foreign policy and war issues, it appeared obvious to the citizens to listen to the military experts.

By listening to the experts, ordinary Athenian citizens acquired and increased their own knowledge. A thirty year old Athenian, if he had followed half the number of ordinary meetings of the Assembly (eg. 20 out of 40 during the 4th century, Hansen 1999) would have attended 200 meetings over the course of then years. During these, he would have heard speeches and proposals by the experts in such different fields as foreign policy, military affairs, economics, laws etc. By then he would have accumulated sufficient experience and knowledge to be able to make correct decisions on the most issues.

CONCLUSION

Table 2 summarizes summarizes our findings: It shows that the values that gradually developed as an entail of the functioning of the phalanx and the triremes, such as self-consciousness, cooperation, cohesion, "homonoia" (same-mindness), equality, trust, solidary etc were "diffused" from warfare to the political field and became self-consciousness "isonomia" (equality to the law), "isegoria: (freedom of speech), concord and patriotism. Democracy seems to have gone hand in hand with cohesion and solidarity throughout all over the Athenian society. Thus, Athenians achieved what the ancient politician Demades referred to as "the glue of democracy"[20].

(…………………………….……Table 2 about here………………………….………)

We have presented a theoretical perspective using two behavioural mechanisms of why and how democracy emerged for the first time in Ancient Greece. The first was the coordination and cooperation developed in the phalanx, in the ships and the fleets. This again created a specific new macroculture of values, norms, morals, etc.

The second behavioural mechanism is bounded rationality which worked as a sort of "cognitive glue" that made the various aspects of macroculture interdependent and through the diffusion of these values, norms etc. brought about a new political regime, democracy. Thus, the change in the "general" macroculture generated a break in political path-dependence (from older established political systems like kingship, oligarchies and tyrannies) and made political change, in the form of direct democracy, a possibility. Coupled with specific historical events, democracy did emerge in some city-states by the end of the 6th century BC and became more common during the 5th, and even more during the 4th century, while it was developed in the form of democratic federations of many city-states, with the Aetolian and Achaean Leagues of the 3rd century being probably, the most representative ones.

We suggest as a development of the analysis the examination of the emergence of macrocultures and its links to democracy in further historical cases, as for example the Phoenician city-states, the emergence of the Roman Republic after Rome's introduction of

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[20] Eubulus and Lycurgus achieved such a compromise, which we interpret as the first actual social contract ever, during the second half of the 4th century, when they balanced the interests of the "war" and the "peace parties" through a reorientation of policy (Kyriazis and Economou, 2012c, Kyriazis 2009, Kyriazis and Paparrigopoulos 2011b).

hoplite equipment and the phalanx during the 6th century and its "turn to the sea" during the Punic Wars of the third century, the Scandinavian Viking societies, the Swiss cantons, and the re-emergence of more democratic forms of government in England, the United Provinces, the USA[21] and France during the 17th and 18th centuries.

References

Ancient Authors

Anthiphon, "Peri Omonoias" (Ant.).

Aristoteles, "Athinaion Politeia" ("The Athenian's Constitution", Ar. "Ath. Pol.").

Aristoteles, "Politics" (Ar., "Pol.").

Herodotus, "History" (Her.).

Hesiod, "Work and Days".

Homer, "Iliad" (Il.)

Plato, "Criton", "Laches", "Republic".

Plutarch, "Moralia" (Plut. Mor.).

Thucydides, "History" (Hist.).

Xenophon, "Lacedemoneion Politeia" (Lac. Pol.).

Modern Authors

Abrahamson E. and C.J. Fombrun, (1994), "Macrocultures: Determinants and Consequences", Academy of Management Review 19, 728-755.

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[21] Cronin (1999) and Matsuaka (2005a and b) analyse this for the working of American present day direct democracy, pointing out the role of "cues" as a mechanism of decision making that minimizes transaction costs. This again is a counter argument against Buchanan and Tullock (1962) who argue that direct democracy cannot work in great political entities because of high decision making costs for the individual (eg. information and negotiating costs with other parties). But "rules of thumb" such as trust and guidance by the acknowledged expert reduce these costs and thus make direct democracy viable for today's big political entities.

Abrahamson, E. and C.J. Fombrun, (1992), "Forging the iron cage: Interorganisational networks and the production of macro-culture", Journal of Management Studies 29, 175-194.

Acemoglu D. and J.A. Robinson, (2000), "Why did the West extend the franchise? Democracy, inequality and growth in historical perspective", Quarterly Journal of Economics 115, 1167-1199.

Acemoglu, D. and J.A. Robinson (2006), "The Economic Origins of Dictatorship and Democracy", Cambridge University Press.

Adler, P. (2001), "Market, hierarchy and trust: the knowledge economy and the future of capitalism" Organisation Science 12, 215-234.

Aidas, J. (1989), "Great Leaders", Talbot Press.

Almond, G.A. and S. Verba (1963, reprinted 1989), "The Civic Culture: Political Attitudes and Democracy in Fire Nations", Sage Publications.

Alpizar, F., F. Carlsson and O. Johansson – Stenman, (2008), "Anonymity, Reciprocity and Conformity: Evidence from Voluntary Contributions to a National Park in Costa Rica", Journal of Public Economics, 92, 1047-1060.

Amemiya, T. (2007), "Economy and Economics in Ancient Greece", Routledge.

Arrow, K.J. (1974), "The Limits of Organization", Norton Publishers.

Arthur, B.W., (1989), "Competing Technologies, Increasing Returns and Lock-in by Historical Events", in Economic Journal 99, 116-131.

Arthur, W.B., (1997), "Beyond Rational Expectations: Indeterminacy in Economic and Financial Markets", in J.N. Drobak and J.V.C. Nye, editors, "The Frontiers of the New Institutional Economics", Academic Press 291-304.

Birgalias, N. (2009), "From social to political majority: The stadium of isonomia", Patakis Publishers, (in Greek).

Bitros G. and A. Karayannis (2008), "Values and Institutions as Determinants of Entrepreneurship in Ancient Athens", Journal of Institutional Economics 4 205-230.

Bitros, G. and A. Karayannis (2010), "Morality, institutions and the wealth of nations: Some lessons from ancient Greece", in European Journal of Political Economy 26, 68-81.

Briant, P. (1999), "The Achaemenid Empire", in K. Raaflaub and N. Rosenstein, editors "War and Society in the Ancient and Medieval Worlds", 105-128, Harvard UP.

Buchanan, J. And G. Tullock (1962), "The Calculus of Consent", University of Michigan Press.

Burn, A.R. (1960), (new ed. 1975), "The Lyric Age of Greece", St. Martin's Press.

Burn, A.R. (1962), (new ed. 1984), "Persia and the Greeks", Minerva Press.

Camerer C. and A. Vepsalainen, (1988), "The economic efficiency of corporate culture", Strategic Management Journal 9, 115-126.

Cartledge, P. (1996), "La nascita degli oplite l'organizzazione militare" in S. Settis ed. "I Greci", Vol. 2 Einaudi, 681-714.

Clark, A., (1997), "Economic Reason: The Interplay of Individual Learning and External Structure", in J.N. Drobak and J.V.C. Nye, editors, "The Frontiers of the New Institutional Economics", Academic Press 269-290.

Cohen, E. (1997), "Athenian Economy and Society: A Banking Perspective", Princeton University Press.

Cohen, E.E. (2002), "An unprofitable masculinity", in P. Cartledge, E.E. Choen and L. Foxhall, "Money, Labour and Land", Routledge.

Coleman, J. (1990), "Foundations of Social Theory", Harvard UP.

Connolly, P. (1977), "The Greek Armies", Macdonald Educational.

Connor W.R. (1988), "Early Greek Land Warfare as Symbolic Expression", Past and Present 119, 3-29.

Cronin, E.T. (1999), "Direct Democracy: The Politics of Initiative Referendum and Recall", Harvard UP.

d'Amato, R. (2009), "Imperial Roman Naval Forces 31 BC – AD 500", Osprey Men at Arms Series 451.

Dahl, R. (1966), "Political Oppositions", Yale UP.

David, P.A. (1985), "Clio and the Economics of Qwerty", American Economic Review 75:2, 332-337.

de Souza, Ph., (2002), "The Peloponnesian War 431-404 BC", Osprey Essential Histories 27.

de Ste Croix, G.E.M. (2004), "Athenian Democratic Origins", Oxford UP.

Dewan, T. And D.P. Myatt (2008), The Qualities of Leadership: Direction, Communication and Obfuscation", American Political Science Review 102(3), 351-368.

Falk, A., U. Fischbacher and S. Gächter (2010), "Living in the neighbourhoods – Social Interaction effects in the laboratory", Economic Inquiry, doi: 10.1111/j.1465-7295.2010.00332.x,1-16.

Fink, K.M. and A. Kessler (2010), "Cooperation, Trust and Performance – Empirical Results from Three Countries", British Journal of Management, Vol. 21, 469-483.

Finley, M. (1982), "Economy and Society in Ancient Greece", ed. B. Shaw & R. Saller, Viking.

Fleek, R.K., and F. A. Hanssen, (2006), "The origins of Democracy: A model with Application to Ancient Greece", Journal of Law and Economics 49, 115-145.

Forrest, W.G. (1966), "The Emergence of Greek Democracy", Weidenfeld and Nicolson.

Fukuyama, F. (1995), "Trust: The Social Virtues and the Creation of Prosperity", Free Press.

Gabrielsen, V. (1994), "Financing the Athenian Fleet", John's Hopkins University Press.

Glete, J. (1993), "Navies and Nations", Almquist and Wiksell International.

Gnirs, A. (1999), "Ancient Egypt", in K. Raaflaub and N. Rosenstein, editors "War and Society in the Ancient and Medieval Worlds", 71-104, Harvard UP.

Granovetter, M., (1992), "Problems of explanation in economic sociology", in N. Nabria and R.G. Eccles, editors, "Networks and organizations: Structure, form and action", Harvard Business School Press, 25-56.

Greif, A., (1994), "Cultural Beliefs and the Organisation of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies", Journal of Political Economy 102, 912-945.

Hale, J.R. (2009), "Lords of the Sea", Viking Press.

Halkos G. and N. Kyriazis (2010), "The Athenian economy in the age of Demosthenes", in European Journal of Law and Economics, 255-277.

Hansen, M.H. (1999), "The Athenian Democracy in the Age of Demosthenes", Bristol Classical Press.

Hansen, M.H. (2006), "Polis", Oxford University Press.

Hanson, V. (1995), "The Otter Greeks: The Family Farm and the Argarian Routs of Western Civilization".

Hanson, V.D. (1989), "The Western Way of War", Hodder and Stougton.

Hanson, V.D. (1996), "Hoplites into Democrats: The changing ideology of Athenian infantry", in J. Ober, C. Hedrick editors, "Demokratia: A conversation on Democracies, Ancient and Modern", Princeton UP, pp. 289-312

Healy, M. (1992), "The Ancient Assyrians", Osprey Elite 39.

Heinemann F., R. Nagel and P. Ockenfels, (2004), "Measuring Strategic Uncertainty in Coordination Games", CESIFO Working Paper 1364, Category 6, Monetary Policy and International Finance.

Hellwig C., and L. Veldkamp (2009), "Knowing what others know: Coordination Motives in Information Acquisition", Review of Economic Studies 76(1), 223-251.

Hogan R., G.J. Curphy, and J. Hogan (1994), "What we know about leadership", American Psychologist 49, 493-504.

Hollander, E.P. (1985), "Leadership and Power", in G. Lindzey and E. Aronson, editors "The handbook of social psychology", Random House, 485-537.

Holowitz, D. (1985), "Ethnic Groups in Conflict", University of California Press.

Huntington, S., (1968), "Political Order in Changing Societies", Yale UP.

Isakhan, B., (2006), "Engaging Mesopotamia's `Primitive Democracy': Re-thinking the Democratisation of the Middle-East", Paper presented to the Second World Congress for Middle Eastern Studies, Amman, Jordan, 11-16 June.

Jameson, M.H. (2002), "On Paul Cartledge: The political economy of Greek slavery", in P. Cartledge, E.H. Cohen and L. Foxhall, editors, "Money, Labour and Land", Routledge.

Jones, C., W. Hesterly and S. Borgatti (1997), "A General Theory of Network Governance; Exchange Conditions and Social Mechanisms", Academy of Management Review, Vol. 22(4), 911-945.

Kale, P., J.H. Dyer and H. Singh (2002), "Alliance capability, stock market response, and long term alliance success: the role of alliance function", Strategic Management Journal, 23, 747-767.

Kramer, A. (1999), "Trust and distrust in organisations: emerging perspectives, enduring questions", Annual Review of Psychology 50, 569-598.

Krentz, P. (1985), "The nature of Hoplite Battle", in Classical Antiquity, Vol. 4(1) 50-61.

Krentz, P. (2007), "Warfare and Hoplites", in H.A. Shapiro (ed.), Archaic Greece, Cambridge UP, 61-84.

Kyriazis, N. (2006), "Seapower and Socioeconomic Change", in Theory and Society 35, 71-108.

Kyriazis, N. (2009), "Financing the Athenian State: Public Choice in the Age of Demosthenes", in European Journal of Law and Economics 27, 109-127.

Kyriazis, N. (2012), "Why Ancient Greece: The birth and development of democracy", Psychogios eds., Athens, Greece

Kyriazis, N. and E. M. Economou (2012a), "The Emergence of Property Rights and Social Contract in Classical Greece", in "Inventi Journal", 49(12), 1-6.

Kyriazis, N. and E. M. Economou (2012b) "Macroculture, Sports and Democracy in Classical Greece" paper presented at the Heilbronn Conference "The University according to Humbolt", June 2012.

Kyriazis, N. and Economou, E.M. (2012c), "Social Contract, public choice and fiscal repercussions in classical Athens" paper Presented at the "12th Erfurt Conference on Fiscal Sociology", October 2012.

Kyriazis, N. and M. Zouboulakis (2004), "Democracy, Sea Power and Institutional Change: An Economic Analysis of the Athenian Naval Law", in European Journal of Law and Economics 17, 117-132.

Kyriazis, N. and T. Metaxas, (2010), "Bounded Rationality and Institutional Change", Evolutionary and Institutional Economic Review 7(1) 1-19.

Kyriazis, N., X. Paparrigopoulos (2011b), "The Birth of Democracy", Values in War and Politics in Classical Greece", in P. Herrmann, editor "Democracy in Theory and Action", Nova Publishers, pp. 177-188

Kyriazis, N., X. Paparrigopoulos (2012), "War and democracy in Ancient Greece", in European Journal of Law and Economics), DOI 10.1007/s10657-012-9352-1.

La Porta, R., F. Lopez de Sclanes, A. Schleifer and R.W. Vishny (1997), "Trust in large oganisations", American Economic Review 87(2), Papers and Proceedings 333-338.

Malone, T. and K. Crowston (1994), "The Interdisciplinary Study of Coordination", ACM Computing Surveys 26(1), 87-119.

Manzini, P., A. Sadrieh and N. Vriend (2009), "On Smiles, Winks and Handshakes as Coordination Devices", The Economic Journal 119, 826-854.

Matsuaka, J. (2005a), "The eclipse of legislatures: Direct Democracy in the 21st century", in Public Choice, 124, 157-177.

Matsuaka, J. (2005b), "Direct Democracy Works", in "The Journal of Economic Perspectives", Vol. 19 No 2, 185-206.

Merrill, C. (2011), "The Rumes", Delphi Conference on Democracy, 12-15 September 2010, forthcoming "Journal of Economic Asymmetries".

Morris, I. (2007), "Early Iron Age Greece", in Editors W. Scheidel, I. Morris and R. Saller, "The Cambridge Economic History of the Greco-Roman World", Cambridge UP, 175-120.

Morris, I., (1994), "The Athenian Economy twenty years after the Ancient Economy", Classical Philology 89, 351-366.

Morrison, J.S. and Coates, J.F. (1986), "The Athenian Trireme", Cambridge, U.S., 2nd edition 2000.

Myatt, D.P. and C. Wallace (2009), "Endogenous Information Acquisition in Coordination Games", Discussion Paper, Series 445, Department of Economics, Oxford University, ISSN 1471-0498.

Nelson, R.N. and S.G. Winter, (1982), "An Evolutionary Theory of Economic Change", Harvard UP.

North, D. (1978), "Structure and Performance: The Task of Economic History", Journal of Economic Litterature 16(3) 963-978.

North, D. (1984), "Transaction Costs, Institutions and Economic History", Journal of Theoretical and Institutional Economics 140, 7-17.

North, D. (1990), "Institutions, Institutional Change and Economic Performance", Cambridge UP.

North, D. (1994), "Economic Performance through Time", The American Economic Review 84(3) 359-368.

North, D., (1981), "Structure and Change in Economic History", W.W. Norton and Co.

North, D., (1993), "Institutions and Credible Commitment", Journal of Institutional and Theoretical Economics 149, 11-23.

North, D.C. and B.R. Weingast, (1989), "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in 17th Century England", Journal of Economic History 49, 803-832.

O'Donnell, G. and P.C. Schmitter, (1986), "Transitions from Authoritarian Rule: Tentative Conclusions about Uncertain Democracies", John Hopkins, UP.

Oman, C.W.C. (1885 and 1973), "The Art of War in the Middle Ages", Cornell UP.

Peers, C. (1995), "Imperial Chinese Armies", Osprey, Men-at-Arms 284.

Pitsoulis, A. (2011), "The egalitarian battlefield: Reflections on the origins of majority rule in Archaic Greece", European Journal of Political Economy 27(1) 87-103.

Polanyi, K. (1957), "Aristotle Discovers the Economy", vin. G. Dalton, ed. "Essays of Karl Polanyi", Primitive, Archaic and Modern Economies", Beacon Press, Boston, 1968, 64-96.

Putnam, R., (1993), "Making Democracy Work", Princeton UP.

Raaflaub, K. (1999), "Archaic and Classical Greece", in K. Raaflaub and N. Rosenstein", War and Society in the Ancient and Medieval Worlds", Center for Hellenic Studies, Colloquia 3, Harvard UP, 129-161.

Raaflaub, K. (2008), "Homeric Warriors and Battles: Trying to Resolve Old Problems", in Classical World, Vol. 101(4), 469-483.

Raaflaub, K.A., J. Ober, R.W. Wallace, P. Cartledge, C. Farrar (2007), "Origins of Democracy in Ancient Greece", Princeton UP.

Rabushka, A. and K.A. Shepsle, (1972), "Politics in Plural Societies", Charles E. Mervill.

Rodger, N. (1997), "The Safeguard of the Sea", Harper-Collins Publishers.

Roth, J.P. (2009), "Roman Warfare", Cambridge UP.

Schefold, B., (2010), "The applicability of modern economics to forms of capitalism in antiquity", Delphi Conference on Democracy, 12-15 September, forthcoming, Journal of Economic Asymmetries.

Sekunda, N. (1998), "The Spartan Army", Osprey Elite 66.

Sekunda, N., (1986), "The Ancient Greeks", Osprey Elite Series 7.

Simon, H. (1983), "Reason in Human Affairs", Basil Blackwell.

Simon, H., (1982), "Models of Bounded Rationality", Vols 1 and 2 MIT Press.

Simon, H., (1991), "Bounded Rationality and Organisational Learning", Organisation Science 2:1, 125-134.

Snodgrass, A., (1965), "The Hoplite Reform and History", Journal of Hellenic Studies 85, 110-122.

Strauss, B.S. (1996), "The Athenian trireme, School of democracy", in J. Ober and C. Hedrick, editors, "Demokratia: A conversation on Democracies, Ancient and Modern", Princeton UP, pp. 313-25.

Stuurman, S. (2004) 'The voice of Thersites: Reflections on the origins of the idea of equality', Journal of the History of Ideas, vol. 65(2):171-189

Sugden, R. (1984), "Reciprocity: The Supply of Public Goods through Voluntary Contributions", Economic Journal 94, 772-787.

Tocqueville, A. de (1856, 1967), "L' ancien regime et la revolution", Editions Gallimard.

Van Huyck, J.B., R.C. Battalio and R.O. Beil, (1990), "Tacit Coordination Games, Strategic Uncertainty, and Coordination Failure", American Economic Review 80, 234-248.

Van Vugt, M., (2006), Evolutionary Origins of Leadership and Followership", Personality and Social Psychology Review, Vol. 10(4), 354-371.

Van Weeg, H. (2004), "Greek Warfare: Myth and Realities", Duckworth.

Warry, J. (1980), "Warfare in the Classical World", Salamander books.

Wayne-Farris W., (1999), "Japan to 1300", in K. Raaflaub and N. Rosenstein, editors "War and Society in the Ancient and Medieval Worlds", 47-70, Harvard UP.

Weber, M. (1899), "Economy and Society", English edition by G. Roth and C. Wittich, Beskeley, UP 1978.

Weingast, B.R. (1997), "The Political Foundations of Democracy and the Rule of Law", The American Political Science Review, Vol. 91(2), 245-263.

Williamson, O. (1991), "Comparative economic organisation: The analysis of discrete structural alternatives", Administrative Science Quarterly 36, 269-296.

Williamson, O., (1975), "Markets and hierarchies: Analysis and antitrust implications", Free Press.

Xu, L. and B. Beamon (2006), "Supply Chain Coordination and Cooperation Mechanisms: An Attribute-Based Approach", The Journal of Supply Chain Management Winter, 4-12.

Yates R.D.S. (1999), "Early China", in K. Raaflaub and N. Rosenstein, editors "War and Society in the Ancient and Medieval Worlds", 7-46, Harvard UP.

Figure 1. Decision Tree and Integration of Various Elements of Macroculture
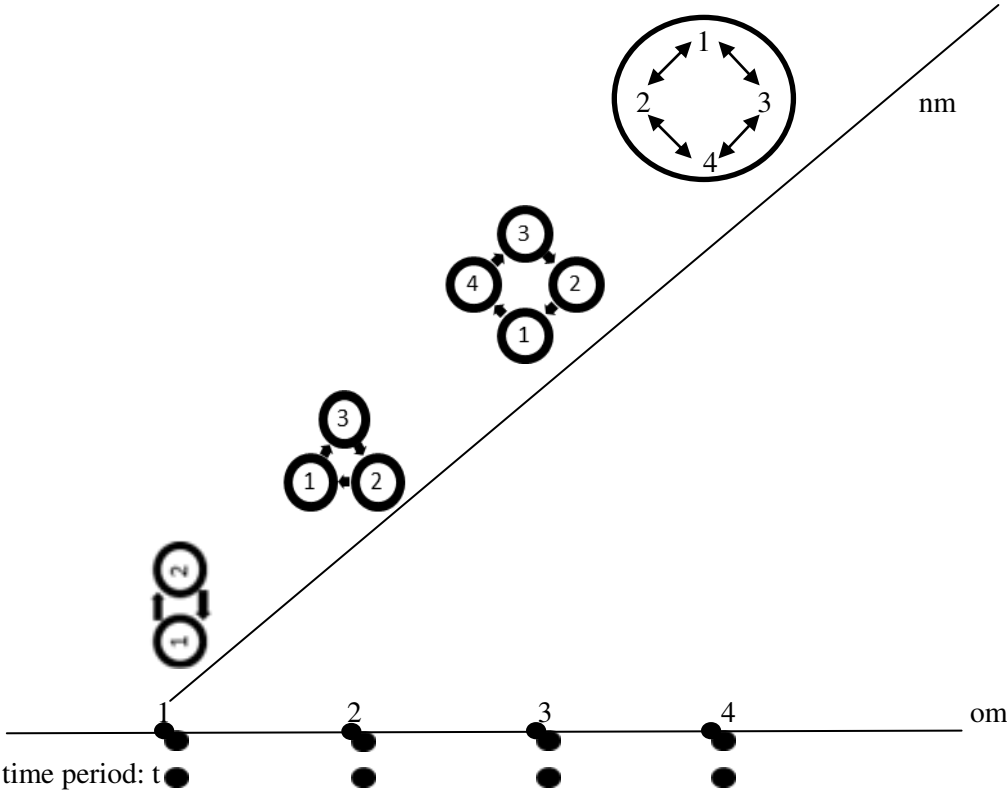
Figure 2. Transition from the old to the new macroculture
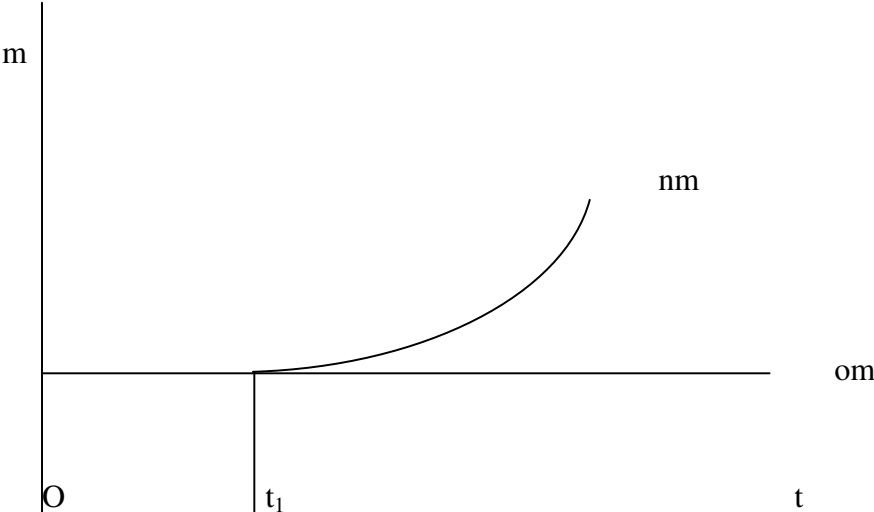
Table 1: Decision Tree Probabilities

Time Period:	1	2	t
nm: new macroculture	p_{n1}	$P_{n2}=(p_{n2})/p_{n1}$	$P_{nt}=(p_{nt})/p_{nt-1}$
om: old macroculture	$1-p_{n1}$	$1-p_{n2}$	$1-p_{nt}$

Table 2: Transformation and diffusion of military into political values

Values				
Behavioural mechanism: Coordination and cooperation mechanism	**Means**	**Military Values**	**Behavioural Mechanism: Channel**	**Political Values**
phalanx triremes fleets	Training "language" learning "education	self-consciousness cohesion equality obedience teamwork trust	"Satisficing" due to bounded rationality, adaptation of known solutions, networks, "cues".	self-consciousness *isonomia* (equality) *isegoria* (freedom of speech) *omonoia* (unanimity) Abiding by Assembly's and courts' decisions, obeying the law, community of interests (positive sum game)