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The failure of ancient Greek growth: institutions, culture and energy cost

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Abstract. Along with introducing democracy, advancing philosophy and excelling at the arts, during the period 800–300 BCE ancient Greece achieved substantial economic prosperity. Recent literature attributes the efflorescence to the institutions and culture of democratic city-states. However, the city-states failed to initiate sustained growth. Technological progress remained slow and the economic efflorescence ended after the prevalence of Macedon and the subsequent Roman conquest. The present study scrutinises the roles of city-state institutions and culture. It shows that ultimately ancient Greece could not sustain long-run growth because a multitude of independent small city-states prevented the exploitation of economies of scale and stoked continual wars that exhausted them financially and militarily, and because of a culture valuing landholding, self-sufficiency and collectivist attitudes.

1 Introduction

Recent research has documented that over the period 800–300 BCE, in addition to democracy and great intellectual and artistic accomplishments, ancient Greece experienced significant population growth and substantial improvement in the standard of living. However, this 'efflorescence' did not last. Economic prosperity relied on expanding trade rather than industrial development and the economy failed to sustain growth. After the 322 victory of Macedon over Athens and the Greek city-states, democracy declined and the efflorescence gradually unravelled.[1] In 146, the Roman conquest of mainland Greece ended any prospect that the city-states would ignite lasting development. Thence, ancient Greek economic performance displays an inverse U-shape. Scholars have focused on the upward part of this profile. Applying modern theories of institutions and culture as the fundamental causes of the Industrial Revolution, they attribute the growth of the ancient Greek economy to institutional innovation, especially the establishment of city-state democracy, and an accompanying 'robust civic

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1 The year 322 is a standard cut-off date. In the period 323–146 BCE (from the death of Alexander the Great to the Roman occupation), democracy continued in the city-states of the Aetolian and Achaean Leagues and even Athens managed to regain a modicum of independence from Macedon.

culture' that guided social norms. Institutions are 'the rules of the game' that constrain behaviour, regulate conflict, govern exchanges and determine wealth accumulation. Culture is the set of customary beliefs and values governing how nature and society work and the norms of behaviour derived from those beliefs that are transmitted from generation to generation. According to Morris (1994: 365) 'economics, politics, and culture turned together in a tight circle, transforming all aspects of Greek life'. The present paper focuses on the downward part of the profile and enquires whether the same fundamental factors contained unfavourable elements that may explain the failure to sustain growth. In addition, it explores how far geographical factors were in any way responsible for the economic regression.

Section 2 surveys the current state of knowledge about a range of economic variables in ancient Greece. Section 3 summarises modern scholarship that ascribes the ancient Greek efflorescence to democratic institutions and prevailing culture. Section 4 searches for flaws in ancient Greek city-state institutions that worked against development focusing on three elements: small scale economy, fiercely competitive democratic setup and incessant wars. Section 5 focuses on cultural traits that might have impeded development and especially attitudes towards work, wealth accumulation and individual rights. Motivated by theories of growth that emphasise the importance of deep-seated geographical factors, Section 6 examines the cost of energy from animate sources relative to labour as an obstacle to growth. Section 7 concludes.

2 The performance of the ancient Greek economy

Scholars have long debated whether the nature of the ancient Greek economy was primitive or substantive, that is, embedded in politics and religion, or modernist/formalist, operating as an independent area of interest (Engen, 2004, offers an informative survey). According to the former, and Max Weber in particular, ancient Greece (and Rome) lacked an ideology with an interest in enterprise and growth, thereby failing to start a capitalist transformation. The elites were a parasitic class engaging in politics instead of productive investment. Exchanges aimed to satisfy basic human needs and were based on reciprocity and state redistribution rather than market forces. The ancient economy was embedded in the political and religious spheres, and people were interested in status, 'an admirably vague word with considerable psychological element' (Finley, 1973: 51), rather than profit maximisation. It remained small scale, focused on household production, and pursued the ideal of self-sufficiency at the household and the city-state level (see also Millet, 2000; Sallares, 1991). Living off rents was 'morally superior' to market pursuits and neither private nor state actors managed their economic affairs rationally. As only opening up new lands could generate growth, the city-states could never escape the Malthusian trap. On the other hand, in the modernist/formalist account the ancient economy

was market-based with interconnected markets, independent of social relations, and ran according to commercial principles (Burke, 1992; Cohen, 1992; Harris, 2002).

Over the last few years, a number of studies have shown that the ancient Greek economy experienced considerable growth and prosperity, including the development of complex market transactions, sophisticated contracts and expanding international trade in basic commodities and luxuries. Davies (2007: 361) detects a 'strong hint of a Protestant ethic' in the pursuit of profits. Foxhall (2007) rejects binary labels, arguing that both the modern and the ancient economies are embedded, as they are products of cultural and social systems. Most recently, Harris and Lewis (2015), and Bresson (2016) argue that the 'New Institutional Economics' approach and the emphasis on transaction costs offers indispensable insights for understanding the choices and rationality of the ancient economic agents. Scouring through the extant sources, they amass evidence showing that contrary to the primitive view, farmers ran their business with the aim of improving yields and profits, and far from being 'consumer' or 'parasite cities', city-states were undoubtedly manufacturing sites. For example, Halkos and Kyriazis (2010) calculate that in Athens the combined shares of the manufacturing and service sectors in employment and output exceeded that of agriculture.

Using archaeological and forensic evidence (the ancients did not collect figures on any economic variables), scholars conclude that during the Archaic times, 800–500, and Classical period, 500–300, the city-states of ancient Greece were prosperous and none more so than democratic Athens, especially during the latter part of the 4th century. Over the 500 years between 800 and 300, the population grew tenfold. It is a measure of the success of the ancient economy that in the later 4th century BCE the population of mainland Greece (the Peloponnese, Continental Greece, Thessaly and the Aegean and Ionian Sea islands) was between 2.75 and 3.5 million people, while in 1890 CE it stood at 2.3 million. Most remarkably, real per capita consumption rose by an annual rate of 0.18%, greater than the 0.10% of the Early Roman Empire, 30 BCE–284 CE, and not far-off the 0.20% of 1580–1820 pre-industrial Holland (Ober 2015). During the Classical period, about a third of the population of mainland Greece imported its food, and about a third of the wider Greek world lived in urban areas (ibid.).

Other indicators show a significant improvement in living standards. Median house surface expanded from 80 square metres in around 800 BCE to 360 square metres in 300 BCE (Morris, 2004). Wealth and income inequalities were present, but were comparable to contemporary capitalist economies. Regarding Athens, Patriquin (2015: 40) writes that 'close to three-quarters of the citizens had some access to land – their own means of production which enabled them to avoid exploitation (that is, they were not required as part of coercive social relations to hand over part of their produce to members of another social class)'. For late 4th-century Athens, Kron (2011) calculates a Gini coefficient of 0.71 comparing

favourably to 0.79 in 1427 Florence, 0.95 in 1911 England and 0.93 in 1912 USA. For the same period, and for the income distribution of the entire Athenian population (citizens, free aliens or metics, and slaves), Ober (2015) estimates a Gini coefficient between 0.40 and 0.45. In comparison, the Roman Empire Gini was also in the range 0.42–0.44, but the middle-range frequency (between the richest and the poorest) was substantially larger in the case of Athens (ibid.: 90–91). Similarly, Scheidel (2010) shows that average wages for an artisan in Classical Athens were several times the subsistence cost, implying a robust non-elite consumer demand. This rather populous 'middling' class of citizens living above subsistence established direct democracy and took control of policy making from the elite. Growing per capita income meant that the size of the market was increasing fuelling demand, generating trade and paying for imported luxuries.[2]

From the Archaic period onwards, important technical innovations, a proximate cause of productivity growth, took place including the invention of the alphabet, minting of coinage, hoplite warfare, war machines and shipbuilding, using levers, wedges, screws, ratchets, pulleys and gears. However, unlike the mechanical inventions, neither the alphabet nor coinage directly increased manufacturing productivity. Surveying technological progress from archaic Greece to the Roman Empire, Schneider (2007) uncovers significant developments in the grain mill, oil and wine presses, ceramics and glass, architecture and building techniques, sea and land transport and water lifting. However, 'technological change remained in many cases spasmodic and dependent on specific contexts' (p. 167).[3] As a result, ancient Greek growth, as in other growth episodes before the Industrial Revolution, was propelled by a 'commercial expansion' driven by institutional change and institutional innovation, and realised through open trade rather than technological progress, which was slow. Learning how to farm, or to do metal or building work was a slow process based on experience acquired over time; reliance on such empirical knowledge rather than scientific education implied slow productivity growth.

2 'The market of Athens was so extensive that it had to be subdivided into parts taking their names from the predominant activity in each part, e.g. tanneries part, stonemasons, etc.' (Halkos and Kyriazis, 2010: 269).

3 Some eye-catching technological innovations included the inventions of Archimedes (287–212 BCE) using levers, screws, a heat-ray from parabolic mirrors, and the giant Syracusan ship (Bresson, 2016: 88). In the 4th century, Archytas of Taras, a mathematician, politician and philosopher, had reputedly built 'a form of a wooden dove, which was connected to a pulley and counterweight and "flew" up from a lower perch to a higher one, when set in motion by a puff of air' (*Stamford Encyclopedia of Philosophy*, available at https://plato.stanford.edu/entries/archytas/, accessed 17 May 2018). Towards the end of the Hellenistic period, the introduction of the rotary mill and subsequently the watermill cut the energy and time costs of grain grinding. More strikingly, Heron of Alexandria, a 1st-century BCE engineer, had understood the properties of air, the void, and the behaviour of liquids under the influence of gravity, and built a crude steam engine (Bresson, 2016: 76–79). However, such inventions came when the city-state economy had already declined.

3 Institutions and culture as causes of the ancient Greek efflorescence

The fundamental causes of growth

Per capita output grows when the quantities of the factors of production, land, labour and capital, expand and when the productivity of those factors increases, chiefly because of improvements in technology and organisation. Micro- and macroeconomic policies may also buttress the growth process. But sizes of factors of production, technological progress, organisation, and government policies are endogenously determined, and constitute proximate causes of growth. The fundamental causes of growth determine the incentives of individuals to produce and trade, and of governments to choose policies that assist market trades.[4] Acemoglu *et al.* (2005) distinguish between three fundamental causes: institutions, culture and geography.

The supremacy of institutions thesis argues that the power structure in society is the main determinant of income growth. Political and economic institutions, which protect investors against predatory taxation, hold the government to account, secure property rights, offer equal access to resources, and protect freedom of contracts and the rule of law encourage investment in human capital and spur technological innovation. In this account, the landmark event was the 1688 Glorious Revolution when the English parliament won against King James II (Acemoglu *et al.*, 2005; North *et al.*, 2009). However, even though the king became more dependent on the parliament than before, recent research shows a number of weaknesses in the role of institutions on economic growth (Ogilvi and Carus, 2014, offer a survey). For example, Hodgson (2017) demonstrates that the Industrial Revolution followed a post-1688 financial transformation precipitated by Britain's expanding trade and the need to finance its war efforts.

Cultural causes of development and especially the Industrial Revolution propose a number of disparate mechanisms. Clark (2007) focused on the transmission of cultural values by a biological–demographic chain, where in 16th- and 17th-century England, the economically successful sired more children than the less successful, forming a social environment dominated by middle-class values. Mokyr (2010) argued that an 'industrial Enlightenment' took place, a scientific revolution, which placed observation and experimentation as the bases of knowledge and changed attitudes in politics, including tolerance for intellectual innovation. McCloskey (2010), emphasised 'talk and ideas', especially liberty and equality, resulting in public acceptance of the rise of market traders and manufacturers, previously despised as vulgar by the landed elite.[5]

4 It is of course possible that random events, which affect adversely the proximate factors of growth, may feed back into the fundamental factors and precipitate the adoption of growth – preventing policies and attitudes that decrease capital and productivity growth.

5 Weingast (2016) argues that ideas are probably necessary for economic change but they can only have an impact if they are implemented, which requires the presence of the appropriate institutions to

Geography shapes agricultural and mineral production; it influences the quality of human capital as it determines the climate, natural resources, the disease environment and transport costs, and by determining physical barriers, the ability of a country to defend itself against foreign invaders. Geographical factors may affect productivity and income per capita directly, and indirectly by the choice of economic policies (Gallup *et al.*, 1999). Geographical and biological conditions also explain why in Neolithic times agricultural societies settled earlier in some locations than others. Such early sedentary societies were able to develop a critical level of technology, human capital and organisational structures breaking out of the Malthusian trap ahead of the rest, which explains their current level of development (Olsson and Hibbs, 2005). Further, according to the unified growth theory (Galor, 2011) bio-geographical factors changed the size and composition of the population, which then drove human capital formation and growth. The transition from stagnation to growth became an inevitable by-product of the process of development.[6] In this view, changes in institutions are neither necessary nor sufficient to explain sustained growth after the Industrial Revolution.

The fundamental causes of ancient Greek efflorescence

The scholarship on ancient Greek growth offers institutions and culture as the fundamental drivers of the efflorescence. Geography, natural resources and the Mediterranean climate, are set aside because they are the same before and after the onset of growth (Ober, 2008: 12–13). The 'polis' or city-state as a distinct geographical, political and economic unit was the standard form of political organisation in the Archaic and Classical periods. In truth, geography and military technology explain the emergence of the multitude of city-states, 1,100 of them according to Ober (2015). Mountains, a highly indented coastline and islands fragment the landscape of southern Greece providing natural barriers to small territories that are easily defended by their people. Further, with iron more abundant than copper, the invention of cheaper iron weapons facilitated the emergence of a large class of free farmers who were rich enough to own their armour. They comprised the principal defence force fighting on foot in tight formation. Akin to a part-time militia rather than professional soldiers, their military importance translated into political power and underpinned the emergence of democracy (Lyttkens, 2013). Unlike the Eastern Empires or Rome, the Greek city-states did not consolidate into a single centralised state; they developed a variety of governance structures from democratic Athens

enforce them. See also the exchanges between Grief and Mokyr (2016), McCloskey (2016) and Tabellini (2016).

6 An endogenous dynamic process connects technological development and capital formation: starting from simple technologies, small advances necessitate learning, which increases human capital; greater human capital leads to more technological inventions, and so on until a steady state is achieved.

to oligarchic Sparta and included aristocratic Corinth and the kingdom of Macedon.

How did the institutions and culture of the polis become the engines of growth? Morris (2004) considers citizenship as the most important institutional development. Citizenship comprised the recognition that within a polis all locally born free men had equal rights, regardless of birth or wealth, and rejected the divine right of rulers prevalent in the Eastern empires. Citizenship defined and secured property rights from the predation of autocrats. Economou and Kyriazis (2017) trace a gradual development of the definition and enforcement of property rights from the Archaic period onwards through the emergence of a powerful middle class of landowners and the concurrent establishment of functioning courts to resolve property disputes. Secure property rights lowered transaction costs encouraging large-scale international trade. Bitros and Karayiannis (2010: 71) attribute the success of Athens to 'an environment where, the state guaranteed that property rights would not be expropriated ... and in turn individuals exercised responsibility in their pursuits by balancing their own interests with those of the community in which they lived'. On the contrary, Sparta with an oligarchic government and lacking clear definition and protection of private property discouraged both political and economic innovation. Examining the social norms and legal provisions in forensic speeches, Karayiannis and Hatzis (2012: 635) write '[4th-century] Athenian laws were mainly geared towards the enforcement of contracts and the limitation to the arbitrary economic and political power held by the elites ... They offered the institutional framework that was conducive to the economic and social development of Athens'. In a similar vein, Engen (2005) offers the law of Nikophon (375/4) on money purity and circulation of silver coins as proof of rules deliberately designed to facilitate market transactions and promote Athenian exports.

For Ober (2015: 16):

> The political institutions and the culture put specialization and innovation on overdrive because those institutions and that culture encouraged individuals to take more risks and to develop more distinct skills. They did so by protecting individuals against the theft by the powerful of the fruits of risk-taking and self-investment.

He suggests two principal causes of Greek growth. First, the establishment of fair rules where many people in the society have an equal standing with respect to personal security and property law. Second, much like politically fragmented Europe in the sixteenth century, the intense competition among individuals and city-states, which led to further institutional and technological innovation and motivated welfare-improving cooperation between rational actors. Further, instead of uniquely modern notions of GDP growth, liberal democracy and a centralised government, Carugati *et al.* (2015) define development 'as the ability of a state to provide security, stability, and predictability via the establishment of

reasonably fair rules, and their consistent application and enforcement' (p. 28). Accordingly, by establishing the rule of law for elite and masses alike, and control over the sources of violence through impersonal and perpetual democratic institutions, ancient Athens transited away from the unproductive 'limited access' equilibrium of the natural state towards a stable, open access order that secured a high standard of living.[7]

Bergh and Lyttkens (2014) examine the quality of the economic institutions of Athens in the 340s (a period sufficiently covered in the sources) by applying the Economic Freedom Index.[8] Athens scores an impressive 8.8 out of 10 in the 2013 international league, second to Hong Kong with a score of 9.02 (while modern Greece, with a score of 6.87, was in the 68th position). Although, as the authors acknowledge, this type of comparison has limits, it indicates a strong link between the institutional quality of Athens and its material success.

Bresson (2016: 95) adds that 'institutional and technological innovations went hand in hand ... both ... are a fundamental factor in the process of growth in the Mediterranean area from the Archaic to Hellenistic period'.

However, the ancient Greek economy was unable to start a 'grand transition' to sustained long-run growth. Even though precise quantitative figures are not available, it is clear that ancient Greek growth displays a humped shape. In Hellenistic times (322–331 CE, following the 322 victory of the kingdom of Macedon against Athens), the polis efflorescence entered a phase of long-term decay. After 250 BCE population in the Aegean fell. Greek political independence and prosperity finished with the Roman conquest of Macedon (168), the last remnants of the Greek city-states (146) and Asia Minor (129). Bresson (2016) argues that a fragmented Greek world was no match for Rome. However, war defeat is neither necessary nor sufficient to explain the development failure of ancient Greece. The city-states had been able to stand against the Persian Empire and fought against each other almost incessantly before and during the efflorescence period.[9] Importantly, they did not rebound after the defeat

7 North *et al.* (2009) define a limited access or natural state as one 'where personal relationships form the basis of social organization' (p. 13), and 'dispersed control over violence leads to the formation of a dominant coalition that manipulates access in the economy and the society to sustain political arrangements within the coalition' (p. 121). On the other hand, in an open-access order, 'impersonal categories of individuals, interact over a wide area of social behaviour with no need to be cognizant of the individual identity of their partners' (p. 2), and 'in open access societies, access to organizations is an impersonal right that all citizens possess' (p. 6). A natural state links to an economy embedded in social relationships, while an open-access society supports a market, disembedded, economy.

8 The Index (available at www.fraserinstitute.org/economic-freedom) consists of five dimensions: (1) size of government – expenditures, taxes, and enterprises; (2) legal structure and security of property rights; (3) access to sound money; (4) freedom to trade internationally; and (5) regulation of credit, labour and business.

9 Similarly, before and during the early stage of the Industrial Revolution (conventionally starting in 1760), Britain engaged in several wars without adversely affecting the transition to industrialisation.

by Macedon. We proceed by examining whether the fundamental factors of institutions and culture also contained seeds of economic regression.

4 Limitations of ancient Greek institutions

The independent city-states were small in both population and geographical size; only Athens, Sparta and Syracuse had an area of more than 2,000 square kilometres and estimated populations of 150,000 or more.[10] Modern scholarship enquires how smallness may affect economic outcomes (Armstrong and Read, 2003). Several negative influences are identified. A small internal market and labour force may reduce the potential for competition (only a small number of firms are viable), and be unable to exploit economies of scale or diversify risks. Indivisibilities result in a high per capita cost for public goods. A small geographical size may also imply limited and undiversified natural resources. Small landlocked and island states are likely to incur higher transport costs. As a result, the prosperity of small economies relies on openness and international trade, but this makes them vulnerable to external shocks. On the other hand, there are certain advantages associated with a small-sized state. A small labour force implies that growth will rely on higher value-added activities using human capital intensively, which necessitates investment in education and skills. A small population is likely to be homogeneous and cohesive, and government structure is less likely to be complex, increasing political participation and transparency. However, with frequent contact between politicians and their constituents, inefficient rent seeking may be more prevalent in small societies.

The predictions that contemporary small states suffer low income and slow growth are not borne empirically. Easterly and Kraay (2000) find that on average small states have higher income and productivity levels than large states and their growth rates are more volatile because of exposure to international trade fluctuations, but on balance greater openness is still a positive factor in their growth. Examining the effect of small size on institutional quality, Congdon Fors (2014) finds that small countries and island states score stronger on a rule of law index than larger states, and that being an island has a positive effect on democracy. Going back in history, late medieval and early modern European autonomous cities with prerogatives regarding defence, taxation and judicial matters thrived by relying on extended sea-borne trade. De Long and Shleifer (1993) examine pre-industrial Netherlands and Britain, which flourished under constitutional government. Similarly, the city-states of northern Italy, the Low Countries and Burgundy prospered during the late Middle Age and the

10 Alesina and Spolaore (1997) consider that country size is endogenous depending on the trade-off between the cost savings of a large political jurisdiction and the reduced benefits from lumping together heterogeneous communities. They argue that democratisation leads to an inefficiently large number of countries and economic integration increases the equilibrium number of countries.

Renaissance, but stagnated after they fell under autocratic Habsburg control in the sixteenth century. They find that absolutist governments were associated with low economic growth (as measured by city population growth) for 800 years prior to the Industrial Revolution. In the same vein, comparing the Islamic world to Europe in the period 800–1800, Bosker *et al.* (2013) find that urban growth is positively related to cities with good access to important transport links, but European cities with strong local participative governments and representation in state policy making eventually grew larger than other cities.

Yet Stasavage (2014) presents evidence that although initially autonomous European city-states grew, over time the ruling merchant and craft guilds erected barriers to entry into markets and professions holding back innovation and trade, leading to their eventual decline. Ogilvi and Carus (2014) warn that what matters for growth is the broader underlying institutional framework of the society (property rights, contracting institutions, structure of power) which determines how people become wealth holders and the policies sought through political action, rather than a single institution in isolation (like the parliament). Similarly, Boix (2015) argues that income growth in autonomous city-states tends to be low because of limited economies of scale, diverging individual economic fortunes (which by disturbing the existing distribution of wealth jeopardise the social peace), and defeat by monarchies that are militarily more powerful. In his view, parliamentary institutions dominated by wealthy merchants in autonomous European urban centres were a consequence of their economic strength rather than a cause, and no lasting growth was achievable 'when producers form a closed oligarchy, imposing barriers to innovation and to the entry of new ideas and entrepreneurs' (p. 201).

Ancient polis economy

Economic activity in the ancient polis was organised around the household (*oikos*), comprising the house as a building, its equipment, associated land holdings, the persons living in the house and their belongings. The Athenian legal system did not recognise businesses as autonomous entities for juridical purposes. Business activity was part of the *oikos*.[11] This does not imply that all economic activity was household-scale; forensic speeches attest to the existence of profitable large farms and manufacturing units. For the vast majority of Greek males, ownership of land and related capital installations remained the most critical economic resource for generating income and the basis of citizenship and political rights. However, the combination of poor soil (with a few exceptions like Thessaly and Laconia, which never developed democratic

11 The Athenians did not develop the notion of corporation because they did not distinguish clearly between the activities of the *oikos* and those of the workshop (Harris, 2002), while legal disputes about an *oikos* related to the ownership of the whole *oikos*, not about items under its ownership (MacDowell, 1989).

politics), and Mediterranean climate of warm dry summers followed by wet and mildly cold winters, constrained the types of agricultural activity undertaken and made the risk of harvest failure endemic. Farmers had few options but to diversify into a variety of crops grown in different patches of land of unequal agricultural productivity, and hoard surpluses. This resulted in small fragmented landholdings. Rich households too held diversified assets including houses, farms in different territories, animal stocks, workshops and money deposits. Partible inheritance, where sons receive equal shares of property, not only satisfied horizontal equality but also by dividing property over different locations it served as insurance against harvest failure. Consequently, the economies of the city-states were small and unable to exploit economies of scale, and unit costs of production remained high.

Furthermore, uncertain agricultural yields and the risk of harvest failure led city-states to impose strict regulations on exporting commodities that were vital necessities for the population, distorting prices and the allocation of production activities (Bresson, 2016). Additionally, trading costs were high because of the different taxes imposed by the city-states and the different currencies used.

Since citizenship conferred important political, legal and economic rights, city-states guarded it jealously.[12] As a result, it was impossible to develop business organisations that would cover the Greek world and overcome the small size problem. Different city-states achieved different levels of economic and legal sophistication, while traditional friendships and rivalries between them further complicated the possibility of establishing a common economic space. The multitude of city-states, and the strict land ownership criteria that was used to define citizenship, restricted labour mobility; mercenaries were probably the most mobile part of the labour force. Even though Harris and Lewis (2015) paint a picture of mobile labour, especially skilled workers for construction and physicians, leaving one's birthplace to find work in a different polis was tantamount to disenfranchisement and giving up on owning land.[13] Moreover, although property rights were well defined and secure and contracts were enforced, the ancient Greek city-states lacked fully inclusive economic

12 Most famously, Pericles' law of 451 restricted Athenian citizenship only to those born from two Athenian parents. Similarly, it was indicative of rigidity that membership of an Athenian demes was hereditary instead of depending on residence, an arrangement that originated in the 508/7 reforms of Cleisthenes, which established the Athenian democracy.

13 Labour mobility was higher in the Aetolian and Achaean Leagues, proto-federations of city-states, of the Hellenistic period, which promoted economic and political integration. The citizens of each member state enjoyed equal rights to vote and be elected to the decision bodies of the league, freedom of movement and the right to buy and sell property inside the league, irrespective of their polis of origin (Economou *et al*., 2015, and references therein). Nevertheless, the experience of the Roman Empire shows that an integrated economic space was insufficient for sustained development. During the long period of *Pax Romana* (31 BCE–192 CE), order prevailed and trade thrived, but there was no permanent economic transformation, not least because of failure to rein in the extractive behaviour of the ruling classes.

institutions (considered as essential by Acemoglu and Robinson, 2012) because women, metics and slaves had fewer rights and economic opportunities.

Intra-polis tension

Inside the city-state, maintaining strict democratic egalitarianism ultimately leads to rejection of 'creative destruction', the hallmark of capitalist development. Income equality and income growth are incompatible with each other, for the former requires extensive *ex-post* redistribution that may destroy investment incentives. Even in a society starting with complete equality, some talented or lucky individuals may innovate and grow richer than their peers. Total output increases but is no longer distributed equally. Such income divisions raise the risk that the poor may revolt and confiscate the assets of the economically successful. Similarly, growth may be at risk not only from the poor going against the rich, but by existing elites resisting their loss of privileges when new successful entrepreneurs emerge, and/or opposing redistribution for egalitarian purposes. Over time, successful groups may transform into rent-seeking distributional coalitions, setting barriers against new entrants. Resistance to social change and realignment accompanying growth eventually precipitate economic decline. At the extreme, the rich elite unwilling to pay the taxes required for redistribution may decide to overthrow the democracy and repress the majority. Arming for civil conflict and fighting diverts productive capacity and destroys resources reducing the growth potential. 'Destructive' envy discourages potential entrepreneurs from searching for new products, markets and cost savings (Gersham, 2014).

Athens bears witness to such tensions. During the 5th century, Athenian adult males numbered 60,000 (Hansen, 1999). Two factors relieved tensions from population pressure, employment of the poor as rowers in the Athenian navy, and the establishment of *cleruchies*, land allotments, in territories controlled by Athens. Nevertheless, the Athenian democracy was overthrown twice. In 411 BCE, a coup installed an oligarchic dispensation with only 5,000 Athenians retaining full citizenship rights, but the navy restored the democracy four months later in 410. In 404 after losing the Peloponnesian War, a cruel oligarchic commission known as the 'Thirty Tyrants' governed Athens. The demos however re-established control in 403 following a civil war. In the 4th century, because of casualties in the Peloponnesian War, the plague that struck Athens in 430–426 and the famine during the Spartan siege of 405/404, the number of adult males fell to 30,000. The implied increase in the average land per citizen explains why land redistribution 'is never heard as a problem at Athens' (ibid.: 54). In the 4th century, increased trade and commercialisation created a new class of rich Athenians, whose wealth was not exclusively based on land holdings. As noted, opposing the redistribution necessary to preserve egalitarianism may lead the rich to *stasis*, a violent attempt to bring down the democratic constitution. Indeed, the oligarchic regime established after the 322 defeat by Macedon and

overthrow of the Athenian democracy restricted the franchise by introducing a tight property qualification, and rolled back the fiscal obligations of the rich.

However, conflicts over income distribution have been ubiquitous without preventing modern societies from developing; they cannot be a sufficient reason for the failure of the ancient Greek city-states. Tridimas (2015) suggests that the direct democracy of Athens was vulnerable to attacks from anti-democrats because immobile land was the main component of wealth, and it lacked the protection that political party competition offers in contemporary representative democracies. Specifically, dissatisfied voters vote the incumbent party out of office but keep the system of democratic governance; thus, party competition stabilises the regime. However, in the direct democracy the losers from the policy decisions of the demos had few alternatives but to act against the rule of the demos. Thus, egalitarianism, which underpinned the direct participatory democracy of the polis, may have undermined its long-run growth.

Inter-polis conflict

A multiplicity of fiercely independent and competitive city-states fought almost incessantly against each other as well as external enemies like Persia, Scythia and Rome. After the success against the invading Persians (490–480), in a 141-year span (479–338), classical Athens had no more than ten consecutive years of peace and was at war for two out of three years on average. War and the threat of war not only bring the destruction of existing assets but also discourage investment in human and non-human capital.[14] Since invaders may loot or destroy physical assets, a high risk of war deters capital owners from investing in physical assets, especially those characterised by large sunk costs. This leads to a smaller capital–labour ratio than otherwise, tending to make labour cheap and diminish the incentive to introduce capital-intensive techniques. In addition to destruction, continuous wars diverted resources from productive activities towards military spending and exhausted the public treasuries weakening the city-states against later stronger enemies. Although war is inefficient (because of the diversion and destruction of resources), rational actors may choose war when it is more profitable to seize assets than to produce them. Analytically, while the outcome of violent fighting is uncertain, the expected payoff may be higher than that of peace because the conquest of new agricultural lands and mines offers material wealth and glory (Boix, 2015; Tridimas, 2015).

Since the economy underpins military might, the fundamental cause of the defeat of the city-states and their subjugation to monarchical powers is the relative economic rise of powers in the period preceding the military confrontation, and the political and economic factors driving their relative performance. Specifically, the Athenian economy performed well during the 4th century, but the Macedonian economy performed even better. Macedon proved

14 See Serrati (2013) for the nature, scale and finance of ancient Greek warfare.

to be a superior power possessing fertile lands, gold mines and advanced military techniques. It imitated, learned and adapted the military knowledge and public finance expertise first developed by the city-states to surpass them eventually. Examining the rise of Macedon during the reign of King Philip, 359–336, Ober (2015: 289) writes:

> Philip was a socio-political innovator in that he created a vastly expanded coalition that included tens of thousands of ordinary (non-elite) men ... Philip's military reforms incentivized a great many more individuals to undertake service in the armed forces and enabled them to see themselves as primary stakeholders in the outcomes of state-directed military operations.

The *hoplites*, part-time soldiers, of the city-states could not match the professional and better-resourced Macedonian army.

After the 322 defeat of Athens democracy faded and the independence of the city-states gradually disappeared. The end was not a linear process. Macedon did not fully subjugate the Greek city-states, which retained some aspects of democratic self-governance (Ober, 2015). Athens became a bone of contention between different Macedonian generals; it was able to fight the Chreamonidean war (267–261) and even win independence in 229, but was no longer able to play any significant role in Greece or the conflicts between Macedon and Rome. In a late flourish in the middle of the 3rd century, the Achaean League brought together up to 50 city-states from the northern and central Peloponnese, becoming a significant political and military power in Greek affairs. The neighbouring Aetolian League in all probability also consisted of a number of cities comparable to the Achaean League. Nevertheless, the fragmented Hellenistic poleis and kingdoms eventually succumbed to the more populous, prosperous and militarily superior Rome.

We may then conclude that city-state institutions framed political and economic transactions. They were suitable to initiate growth, but they changed and adapted only slowly, so effectively they were the 'fixed factor of production'. As a result, development based on the city-state format reached diminishing returns.

5 Limitations of ancient Greek culture

How far were the cultural traits of ancient Greece conducive to growth? Three issues are examined here, the ideal of self-sufficiency, attitudes towards wealth accumulation and work, and the position of the individual *vis-à-vis* the collective group. Nevertheless, it should be borne in mind that information about ancient values and attitudes comes from the writings of authors who belonged to the elites, and often members of the latter held different views. There is therefore some ambiguity regarding how far the population shared their views. It is partly

for this reason that modern scholars arrive at different conclusions from the same ancient authors.

The ideal of self-sufficiency

As already mentioned, Finley (1973) claimed that households and communities aimed at self-sufficiency instead of relying on markets. *Autarkeia* had also moral overtones implying independence from others and freedom (Sallares, 1991). An ideology of self-sufficiency inhibited growth. However, recent scholarship rejects, at least partly, such sbstantivist views. Foxhall (2007) suggests that, while poor households were subsistence farmers, wealthy households strived to generate surpluses for buying luxuries to enhance their status. As already said, the ancient Greeks were able to innovate by improving existing products and inventing new technologies, while urban areas were also manufacturing centres for metallurgy, ceramics, leather, textiles and luxury items. Bitros and Karayiannis (2008) conclude that the Athenians honoured successful entrepreneurs and espoused the values of economic freedom, fairness in exchange, obedience to laws and hard work, which encouraged entrepreneurship. Harris and Lewis (2015), and Bresson (2016) also debunk the view that the ideal was self-sufficiency; the average citizen was neither oblivious to profit-making opportunities nor detached from the market.

Attitudes towards work and wealth accumulation

For the majority of the population agriculture was the main occupation and source of wealth. Millet (2000) surmises that in the Aegean world, perhaps half the total population depended directly on farming for its livelihood. A landholding elite scorned wealth from commercial and industrial activities and disdained dependent work. 'The condition of the free man is that he not live under the constraint of another' (Aristotle Rhetoric 1367a32[15]). According to Cohen (2002), Athenian men espoused an ideal of masculinity (*andreia*), whose fundamental element was to maintain self-employment and not to work in the paid employment of others.

Self-employed, free Athenian artisans and traders offered their services as independent operators rather than employees for limited tasks and times, and for different clients. Artisans who earned their living from manual labour were held in low social esteem, because they performed vulgar or brutal (*banausic*) work.[16] However, Bitros and Karayiannis (2010) maintain that the

15 Available at www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0060%3Abekker+page%3D1367a (accessed 4 June 2018).

16 'Labour with one's own hands on lowly tasks gives witness, in the toil thus expended on useless things, to one's own indifference to higher things. No generous youth, from seeing the Zeus at Olympia or the Hera at Argos, longs to be Pheidias or Polycleitus; nor to be Anacreon or Philetas or Archilochus out of pleasure in their poems. For it does not of necessity follow that, if the work delights you with its grace, the one who wrought it is worthy of your esteem' (Plutarch. Pericles. 2.1–2.3 available at

ancient Greeks disdained working for another man, rather than manual work, because it circumcised one's freedom. Bresson (2016) contends that rejection of salaried work probably prevented men from obtaining business skills and work experience outside those offered by the family occupation. Slaves and women filled the ensuing gap. As a result, many slaves owning their own tools (and sometimes their own slaves) and operating their own business were able to prosper. Idealisation of land ownership and agriculture as the noblest economic activity meant that there was little social approval for enrichment through artisanship and trade.[17]

However, Burke (1992) argued that with the onset of commercialism of the 4th century, ordinary Athenian citizens as well as some members of the elite, approved and participated in the commercial and financial ventures:

> The onset of the disembedding of the Athenian economy was made possible by the erosion of an ethic bound to status, by the experience gained from economic exigency, and by the circumstances of an imposed peace, and was occasioned by the impulse to satisfy a habit that had become embedded over time. (p. 225)

Wealth accumulation is a necessary condition for economic growth. On the other hand, 'conspicuous consumption' to enhance one's prestige may not serve any productive purpose, while it may sharpen social tensions. Ancient thinkers considered material wealth as freeing man from deprivation and providing the means to pursue freedom of action. However, they saw it as a means rather than an objective. Seeking to acquire 'man's goods' without developing a 'good man' was denounced as vanity (eloquently presented in Sisyphus' tale) that would lead to the creation of artificial needs and conspicuous consumption.[18] Nevertheless, 'enjoyment of luxuries was part and parcel of the ideology of democracy in Athens' (Millet, 2000: 40).

Another anti-development cultural trait was the prevailing ideology of reciprocal assistance between citizens in the sense of gift exchange, emphasised by

www.perseus.tufts.edu/hopper/collection?collection=Perseus:collection:Greco-Roman, accessed 17 May 2018).

17 'Among [occupations] precedence is given to the one which cultivates the land; those like mining, which extract wealth from it, take the second place. Agriculture is the most honest of all such occupations; seeing that the wealth it brings is not derived from other men. Herein it is distinguished from trade and the wage-earning employments, which acquire wealth from others by their consent; and from war, which wrings it from them perforce' (Aristotle 1343a.1, 'Economics', treatise written most probably by a student of Aristotle; available at www.perseus.tufts.edu/hopper/text?doc=Aristot.%20Econ, accessed 17 May 2018).

18 Socrates encapsulated this view: 'You seem, Antiphon, to imagine that happiness consists in luxury and extravagance. But my belief is that to have no wants is divine; to have as few as possible comes next to the divine; and as that which is divine is supreme, so that which approaches nearest to its nature is nearest to the supreme' (Xenophon Memorabilia, 1.6.10, available at www.perseus.tufts.edu/hopper/collection?collection=Perseus:collection:Greco-Roman, accessed 18 May 2018).

Finley (1973) and Millet (2000), and most interestingly in the so-called *eranos* loans. An individual in need of funds borrowed small or large sums free of interest from family and friends to finance, for example, a liturgy (public service) or a daughter's dowry. The loan was secured on property, and was repaid when practical. Reciprocity meant that as a matter of gratitude lenders expected to receive an equivalent favour when the need arose. Nevertheless, such loans coexisted with commercial loans for financing investment in farms or mines as well as sea-borne international trade, and they could carry interest and lead to litigation like other types of lending in the market (Cohen, 1992).

Attitudes to individual rights and obligations to the collectivity

Liberal ideas that humans are self-interested individuals with inviolable rights and that the individual takes precedence over the state were absent. In the ancient Greek polis, a citizen's rights and obligations followed from being a member of the citizenry; they were public rights and duties (Cartledge, 2016; Held, 2006):

> Citizenship was no inalienable birth right; it was a legal and political creation. It could be redefined in a revolution to give citizen rights to large numbers of new citizens, or to remove citizens, or to reduce the access to political influence of large numbers ... It could be lost for other reasons, treason and impiety being the most serious. (Thomas, 2000: 58–59)

In this sense, the notion of protecting the individual against the might of the state did not exist. To put it another way, there was no liberal Lockean 'social contract', where men free, equal and independent in the state of nature unite into community to live peacefully and pursue the enjoyment of their properties. The idea of freedom related to 'the political freedom for a community to run itself, rather than the freedom of individuals to act as they wished in private life' (Thomas, 2000: 70) and 'the citizens were subordinated to the common good of the community' (ibid.: 72); 'the peculiar division between a narrow public and a broad private realm characteristic of bourgeois regimes was alien to the Greek experience. The claim of the civic community was ... total' (Rahe, 1984: 269). Further, in judging a defendant the Athenian jury often considered whether a verdict of guilt or innocence was good for Athens, rather than for the individual.[19] The trial of Socrates for 'corrupting the youth' and 'not believing in the gods' and his subsequent condemnation to death in 399 is probably the most famous example of the state's command over the individual. An additional illiberal practice was ostracism – voting to banish a political leader for a period of ten years but without additional sanctions – but it was sparingly used (see Tridimas, 2016, and the literature therein). The dominance of the ancient state stands in sharp contrast to the liberal ideology of the 19th century, which

19 'Penalties were set not in accordance with the graveness of the crime but to its antisocial character and immoral nature.' (Karayiannis and Hatzis, 2012: 635)

accepted bourgeois values (including an active economic role for the state to bring in market-expanding reforms, public education and infrastructure), and contributed to both democratisation and industrialisation.

A distinct line of the modern economics literature on culture focuses on the effect of individualism versus collectivism on economic growth (Gorodnichenko and Roland, 2017 and the references therein). Individualism underlines personal freedom and achievement, and confers social status on personal achievements including innovations and actions that make an individual stand out. Collectivism emphasises the embeddedness of individuals in a larger group; it promotes conformity and loyalty to the group and respect for one's superiors, and discourages individuals from dissenting and standing out.[20] Individualism rewards innovation, which can lead to higher growth. Collectivism encourages cooperation leading to greater coordination in society. Therefore, individualism has a comparative dynamic advantage, while collectivism has a comparative static advantage, which may run into diminishing returns. Gorodnichenko and Roland (ibid.) present evidence in support of the hypothesis that more individualistic countries are more affluent. If the ancient Greek culture had embraced collectivism, as the embedded economy view argues, neither an industrial revolution nor sustained growth could have taken place.

Against the above anti-development slant stands the inquisitive attitude of the ancient Greeks. Ober (2008) emphasises their civic culture of developing innovative solutions for aggregating, organising and distributing the knowledge required to run successfully complex political decision-making. Further, Ober (2015) attributes the success of the polis to democratic institutions along with a public discourse culture of 'making good policy (innovative, but not excessively risky) and reducing the level of discord and dissonance between elites ... and the masses of ordinary citizens' (p. 236). Finally, Bresson (2016: 218) writes, 'In fact, ancient Greece saw the beginning of an "enlightened" culture'. He argues that ancient Greece espoused a culture that associated systematic enquiry with technological progress to improve economic outcomes. He submits that ancient Greece set in motion the process of accepting beliefs associated with the Enlightenment, which then drove the Industrial Revolution, but Rome interrupted it:

> A larger population, a greater distance from bureaucratic kingdoms, and especially the egalitarian model of their city-states allowed the Greeks to seize a decisive advantage ... [But] the Roman unification completed the dissolution of the egalitarian legal framework that had held the basis of the Greek city-states' success. (Bresson (2016: 221)

20 According to Hofstede, who developed such measures of cultural dimensions, 'Individualism is the extent to which people feel independent, as opposed to being interdependent as members of larger wholes'; see https://geerthofstede.com/culture-geert-hofstede-gert-jan-hofstede/6d-model-of-national-culture/ (accessed 4 June 2018).

6 The cost of energy relative to labour

Allen (2009) explains the onset of the Industrial Revolution in Britain by the low cost of energy relative to high wage labour owing to abundant coal, a geographical factor, which then stimulated investment into labour-saving technologies (for similar arguments see also O'Brien, 2017; Wrigley, 2010). Thus, a systematic explanation of the failure of the ancient economy to sustain development must also assess the role of the relative cost of energy.

Producing and transporting goods and warming and lighting houses require energy. Natural phenomena, wind, water and sun, and animate sources, wood, oxen, horses and human labour, can generate energy, but they are unreliable and challenging to harness. Wind along with human muscle powered the ships. Animate sources depend on the availability of the land and suitability of the soil. Human labour was used extensively in agricultural activity, craft works and transporting heavy merchandise. Animals were used in agriculture and transport. However, as energy generated by humans and animals cannot be stored, producing energy could not be separated from using it, which restricted severely the productivity gains in generating energy. Charcoal was the main fuel for heating and metalwork, but its opportunity cost is high: Forests take land out of food production and they are depleted if not exploited at a sustainable rate, while of the trees cut down for conversion to charcoal a good deal is needed as firewood. Since the quality of woodland differed across regions, transport costs added to the cost of fuel from wood. Nor can charcoal generate the intense heat required for making steel, a key material of the industrial era. With inadequate forests in most of Aegean Greece, fuel supplies were limited restricting metallurgical outputs. Similarly, raising horses for pulling power in hilly terrain is expensive; it made better sense to use such terrains for growing food. Thus, energy was expensive in ancient Greece a factor that undoubtedly slowed down development (a view also expressed in Bresson, 2016).

Reliance on animate sources of energy also meant that transport costs remained high. Transport costs, which depend on the unit value of the good transported and the distance travelled, determine trade networks. Heavy goods whose value per volume unit is high are expensive to transport and may not be profitable to trade over long distances. As Bresson (2016) observes, tiles (easily manufactured at the local level) can at most be traded over short regional networks, while the opposite is true of perfumes. Overland trade was profitable only for high-value products whose transport costs were low. Heavy goods could be transported profitably only by maritime trade,[21] which depended on

21 'A wagon load of wheat would double in value with a land journey of only 480 kilometres, a camel load in 600 kilometres ... Ship transport, while risky and seasonally restricted, was much more economical ... the only goods that could profitably be transported long distances were those of high relative value – i.e. luxury goods. The bulk of the population, existing on their own agricultural production, could not afford such goods' (Tainter, 1988: 133).

weather conditions. High transport costs are one of the main reasons for an economy to remain agricultural. Further, costly land transport forced city-states worried about famine to rely on domestic production closing opportunities for specialisation. High transport costs also implied that the benefits from technological improvements that reduced 'upstream' or 'downstream' costs in the vertical chain of production could not decrease the price of goods that eventually reached consumers. For example, use of the watermill saved labour time and decreased the cost of grinding grain but did not reduce the cost of baking, which still depended on charcoal. When manufacturing and transport can no longer increase their energy inputs, output reaches its limit and growth stops. Further, the limited adoption of technological inventions and lack of profits from capital-intensive production techniques, implied that a class of industrial capital owners with the motive to increase production and profits, and the ability to pay high wages to finance demand for higher production failed to emerge; as a result, land remained the dominant asset.

Production could expand by buying more land and more slaves. Indeed, the large estates of Hellenistic times using slave labour to produce wine and olive oil were highly profitable. Finley (1973) argued that ancient Greece (and Rome) lacked technological progress because of the use of slave labour. The availability of cheap slave labour reduced incentives to seek capital-intensive technologies that reduce labour costs.[22] However, the present discussion indicates that use of slaves was an endogenous rather than an exogenous factor retarding technological progress. Analytically, as Rogowski (2013) shows, the decision whether to employ slave or free labour is endogenous and production will switch from the former to the latter when technology advances and workers become highly endowed with capital (which increases the marginal product of labour). On this account, slavery was not a cause of slow growth but a symptom of technological backwardness. Nor is free labour on its own sufficient to start an industrial revolution; feudal serfdom had been abolished a long time before the Industrial Revolution.

7 Conclusion

If classical Greece is an icon of democracy, philosophy and fine art, it is also an enigma of failure of growth. At first blush, ancient Greece, and especially Athens, had the institutions and culture, which according to modern views regarding the fundamental causes of the Industrial Revolution and the development of the 'West', are essential for sustained long-run growth. A democratic, urbanised, literate and market-oriented society experienced a period of significant growth. However, the efflorescence ended failing to start an Industrial Revolution. The

22 Slaves lack incentives to innovate when their masters expropriate the returns of their labour, and so do free citizens living off state handouts instead of work, as in imperial Rome.

development of the ancient Greek economy displayed an inverse U shape, whose downward phase has not attracted systematic attention.

The paper argues that the reasons for the failure to sustain growth were that city-state institutions acted as fixed factors and eventually constrained development, which ran to diminishing returns because the city-state format could not overcome the limits of small economic size, internal strife and external conflicts. Arguably, there were also aspects of culture that discouraged accumulation of capital and business skills. A final cause, which has received less attention in the literature, was the lack of cheap inanimate energy resources, which rendered manufacturing and transportation costly and constrained output. This work offers a first attempt towards constructing an explanation of the failure to sustain growth. At the very least, it alludes to a more nuanced contribution of the institutions and culture of the ancient city-states to the Greek efflorescence.

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