

RESEARCH ARTICLE

Choice of slavery institutions in Ancient Greece: Athenian chattels and Spartan helots

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Abstract

The ancient Greek city-states were slave societies, but the institutions of slavery differed across them. The slaves of democratic Athens were foreigners bought as chattels labouring in agriculture, craftsmanship, banking, mining, and domestic services and were often given some limited freedoms and extra pay. On the contrary, the helots, the slaves of oligarchic Sparta, were indigenous of the lands they cultivated for their masters and were treated harshly. The study offers an economic explanation of the different slavery systems. Modelling the slaveholder as a profit maximiser, it attributes the different systems to differences in the probabilities of the slaves running away or revolting, the dependence of output on effort-intensive or care-intensive production technology, which depends on the fertility of the soil and affects whether the slave is treated kindly instead of harshly, and the cost of guarding slaves under different regimes.

Keywords: Ancient Greece; care-intensive and effort-intensive production; chattel slaves; helots; slavery

JEL classification: D21; D24; H2; N3

Introduction

Ancient Greece with her rich tapestry of political institutions was also a slave society in the sense that the wealth and lifestyle of the ruling class was based on the labour of slaves. In the characteristically emphatic language of the eminent ancient historian Moses Finley (1959: 164), ‘One aspect of Greek history, in short, is the advance, hand in hand, of freedom and slavery’. But the free and independent city-states differed in the slavery regimes they established. Despite its cruelties, democratic Athens instituted a soft slavery regime in comparison to a harsh system established by oligarchic Sparta. In Athens, slaves were chattels of foreign origin, working in the land, workshops, the mines, services, and performing domestic chores; although coerced, at the discretion of their owners they could be treated well, rewarded with extra income, allowed to run their own business, form families, and even buy their freedom. On the contrary, the helots, the slaves of the militarised Sparta, were brutally controlled, ‘serf-like’ (for lack of a better term) peasants from indigenous subject populations working what was their land before conquered.¹ Using economic methodology, the present study inquires factors that may explain such differences in the slavery regimes.

A voluminous literature in ancient history and classics has investigated aspects of the Ancient Greek slavery, its roots, nature, ethnic composition, legal status, evolution, ancient intellectual attitudes towards it, artistic representations, and its social, political, and economic implications. This work is

¹ Depending on the action under consideration, the Greeks used a variety of different words to denote a slave: *doulos* (as opposed to free); *andrapodon* (a person taken as war booty subject to the will of the victor); *oiketes* (a slave considered as a member of the basic *oikos*-household unit); *therapon* (servant); *hyperetes* (aide); *akolouthos* (follower); and *pais* (child, indicative of age rather than kinship).

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preoccupied with the power relationship between masters and slaves and its ideological underpinnings. It attributes slaveholding to a host of factors including an ideology of supremacy of the master and the mistress against their subordinate slaves, conspicuous consumption where ownership of slaves especially as domestic servants conferred prestige, and cheap labour for production purposes. However, such reasons for owning slaves shed only dim light to the question of why different institutions of slavery were established. The present study focuses on the latter issue. The analysis starts from the premise that the ruling class of masters, a small, privileged elite in Sparta, a mass of citizens including rich, middle-income, and poor in Athens, choose the system of slavery that maximises their economic benefits. In both harsh and soft slavery regimes, masters face the risk that slaves may revolt or run away and incur costs to control their slaves. Provided that suppression of slaves is successful, the choice of regime depends on the jobs done by the slaves. In production processes involving routine activities that allow easy monitoring of the quality of the work, masters pay slaves subsistence and treat them harshly to secure their highest effort. On the contrary, when production of output requires the care and skill of the labourers, but neither is directly observed or determined by the masters, masters motivate their slaves by treating them gently and offering high pay and other rewards. With land the most valuable productive asset, whether kind treatment of slaves increases output and the master's income depends largely on exogenous geographical factors including the fertility of the soil that determines the crops grown and the mineral wealth.

Far from defending Ancient Greek slavery, its injustices and suffering, the present analysis contributes to two branches of literature. First, it adds to the economics of slavery literature (reviewed in Thornton, 1994). Most prominently in this tradition, Domar's (1970) seminal analysis emphasised that in an agricultural economy slavery which pays subsistence below the market wage arises in response to abundant land and scarce labour, and is sustained by government-imposed repression. Showcasing the cliometrics methodology, the highly influential but also controversial book of Fogel and Engerman (1974) advanced the thesis that in the antebellum US South, slavery was highly profitable and more efficient than family farms in the North, and slaves worked hard not because they were forced but because they were rewarded for doing so. Hanes (1996) noted that employers worried about the lost output if free workers quit at critical times during the agricultural cycle (sowing, harvest, etc.) prefer to use slaves. Examining the long-run transition from slavery to free labour, Lagerlöf (2009) explored a unified growth model which locates slavery in an intermediate range of land-labour ratio values, between a very high value generating an egalitarian regime of small-holders and a low ratio where free labour is so cheap that slavery is not profitable. Building on such 'tipping points' where one labour regime is replaced by a different one, Rogowski (2013) showed that slavery may transition to a profitable free labour system because of shifts in total factor productivity, labour intensity of production, real wage, slave price, and cost of controlling slaves. Regarding the manumission of slaves, Findlay (1975) derived an inverse relationship between the length of time for a slave to buy his freedom and the interest rate, while Weingast (2020) argued that slavery persists because promises of slaves that they will compensate their masters after freeing them lack credibility. However, the choice between different slavery regimes does not feature in these studies.

Closest to the present inquiry is the work of Fenoaltea (1984) investigating reasons for the different treatment of slaves in different activities. Fenoaltea divided productive activities into effort-intensive and care-intensive. The former involves working the land by means of primitive technology. Care-intensive activities require a large input of human capital and specialist equipment, and the profits of the slave-master depend on the care and goodwill of the labourer. He notes that providing the workforce with pain incentives (like whipping) requires costly supervision and generates greater effort but less care since care responds positively to rewards (like money). In high-skill activities, the threat of pain causes anxiety and inhibits performance, a problem compounded by the fact that the slave may often find opportunities for sabotaging production. Use of slave labour under costly supervision may be profitable in activities where the size of production depends on effort, as in growing annual crops like cereals, mining, and construction, since slaves are more likely to be driven by pain incentives. On the contrary, offering rewards may be more profitable in care-intensive and capital-intensive activities,

like growing perennial crops (olive farming and viticulture), crafts, trade, education, and domestic services. His model predicts that in moving away from land-intensive and effort-intensive activities toward care-intensive and capital-intensive activities, slave labour will be treated less harshly, will be less closely supervised, and incidents of manumission will increase.

Second, the paper also contributes to the burgeoning economics research on the institutions of Ancient Greece (recently surveyed by Fleck and Hanssen, 2018). More specifically, it relates to the ground-breaking work of Fleck and Hanssen (2006) who emphasised the importance of the fertility of the land for the development of democracy in Athens and oligarchy in Sparta. Attica, the hinterland of Athens, is characterised by hilly, broken, rather arid terrain suitable for growing olives. Their cultivation requires long-term investment and difficult-to-monitor labour inputs. Such investments could be made only when the mass of farmers enjoy secure property rights and the power to decide public policy, conditions that are accomplished by the adoption of democratic institutions. On the other hand, Laconia and Messenia, Sparta's territories, were large, open, and fertile plains suitable for the cultivation of annual crops, like cereals. These circumstances allowed easy monitoring and control of labour by an elite of warriors who denied mass enfranchisement and maintained oligarchic government. The present paper takes this thesis further and argues that to a large extent such exogenous geographical factors also explain the different slavery regimes of Athens and Sparta.

In what follows, section 'Slavery in Ancient Greece' reviews the information that ancient historians have diligently pieced together about the origins, legal status, numbers, purchase prices, occupations, and treatment of slaves in Athens, and helots in Sparta. Section 'An economic model of slavery regimes' presents the formal model of a master choosing between harsh and soft slavery. Section 'Towards an explanation of the different slavery regimes' applies the theoretical predictions of the model to explain the different slave regimes of Sparta and Athens. Section 'Conclusions' concludes. In sum, the argument is that Sparta established a harsh regime because her fertile lands were suitable for producing cereals, where the slave labour input was easy to control and high yields were obtainable without offering additional rewards to the helots, while the ever-present threat of revolt geared Spartan men towards a military life and sharing of the cost of guarding the helots. On the other hand, the comparatively softer slavery regime of Athens is attributed to the low probability of slave revolt given the heterogeneity of the imported slave population, and the cultivation of olives and vines given her relatively infertile soil.

Slavery in Ancient Greece

In Ancient Greece, various forms of coerced labour are attested from the rise of Mycenae, one of the major centres of the Mycenaean civilisation 1750–1100 BCE, to the Archaic Era 750–500, the Classical Period 500–322, and the Hellenistic Times 322–331 (all dates BCE). Here we focus on the Classical Era when the sources characterise as slaves Athenian chattels and Spartan helots. Information about slaves comes from texts of ancient authors who were themselves slaveholders; there are no slave-written testimonies of the plight of slaves. Enslavement, slave-trading, and commodification of human beings were considered as normal (Braund, 2011). Greek thinkers had no qualms about slavery considering it as part of everyday life.² Aristotle (*Politics* 1254a) writes:

...one who is a human being belonging by nature not to himself but to another is by nature a slave, and a person is a human being belonging to another if being a man he is an article of property, and an article of property is an instrument for action separable from its owner.

The island of Chios opposite the shore of Asia Minor is believed to be the first Greek city-state that instituted chattel slavery in the Archaic Era. At times, her slaves may have counted for half of its

²See Vlassopoulos (2011) for the nuanced meanings of the different words used to describe slavery in Greece, a critique of Aristotle's view of slaves as property, and a discussion of slave identity.

population most of them used in agriculture (Cartledge, 1985: 36). In addition to Chios, Athens, Corinth, Aegina, and Corcyra practiced chattel slavery. Garland (1988: 144) argued that for the Greek society, slavery was a ‘necessary element to affirm its identity’. It provided free men with the resources and leisure to engage in politics, war, social, and intellectual life.³ Unlike slaves, free citizens identified themselves as not being subject to restrictions imposed by other individuals. Although slaveholding was vital for the elite to maintain their lifestyle (Cartledge, 2002), Kyratas (2002, 2011) argues that Ancient Greek authors emphasised domination and ownership of slaves, aspects which relate to political power and legal status of the masters rather than economic considerations.⁴ On the other hand, for Osborne (1995), employment of slavers was rational in the sense that slaves were occupied in jobs that were not worth rewarding more than subsistence, or jobs that were not profitable enough for a free citizen to earn a livelihood (see below for a critical reassessment of such arguments). Inevitably, slavery affected all aspects of personal and social life, politics, the economy, and culture.

Athenian chattel slaves

Athens, the most celebrated Greek city-state, was the quintessential type of direct democracy (see, e.g., Hansen, 1999 for her institutions and their workings). All Athenian citizens (Athens-born males above the age of 20) had the right to participate in the Assembly of the Demos and the popular courts deliberating and deciding all issues of public interest. The Council of Five Hundred, whose members were selected annually from the citizenry by lot, prepared the agenda of the Assembly and executed its decisions. The popular courts made of 6,000 members also appointed annually by lot held to account all magistrates before taking office checking their eligibility, during their service, and after completing their term, and reviewed the decisions of the Assembly. Regarding the economy, gradually, during the Classical Era, Athens showed signs of ‘modernity’ away from ‘primitiveness’ with construction, mining, manufacturing, international trade, banking, justice, and public administration services, as opposed to agricultural output, contributing increasing shares of activity and employment (Bitros *et al.*, 2020: 81–127; Halkos and Kyriazis, 2010 offer detailed accounts).

Slave origins. Slaves in Athens were chattel slaves. Finley (1959) attributed Athenian slavery to political developments: in 594, following a deep political and social crisis setting rich against poor, the statesman Solon abolished debt-bondage removing the threat that poor peasants would fall into slavery. This, in turn, created a sharp distinction between free citizens and unfree slaves with far-reaching implications. First, the economic inequality between master and slave unified the citizens against ‘the rest’ (the unfree and the non-citizens) enabling the political equality between rich and poor citizens, which was the basis of the democratic constitution. Second, use of slave labour afforded citizens the time to engage in democratic politics. Third, the existence of slaves owned by and working for others meant that dependent labour (working for others) was seen as a threat to equality and thence unacceptable to a free citizen. As a result, demand for labour that until Solon’s reforms could have been met by enslaving poor Athenian peasants was thereafter met by importing slaves. They were imported from territories outside Greece, like Lydia and Phrygia of Asia Minor, Syria, and the regions of the Black Sea, especially Scythia. Slaves were acquired as war captives, piracy victims, and by purchase from slave traders, who took slaves from local raids; however, no specific race was targeted.⁵ Except for helots, Greeks were rarely enslaved by other Greeks; even as war captives they were usually ransomed by their city-states. The trade-orientated Athenian economy secured a reliable supply of

³Interestingly, freed ex-slaves had no misgivings about becoming slaveholders when they had the money and opportunity to do so (Hunt, 2018).

⁴Cartledge (2006) reviews modern literature on the prevalence of slavery and the concurrent emergence of an ideology of freedom in Ancient Greece.

⁵See Rihll (1993) and Braund (2011) for the supply of foreign-born slaves. Harrison (2019) argues that holding foreigners as slaves influenced how the Greeks perceived foreigners, which in turn might have implicitly offered justifications of slavery (e.g., those easily deceived or morally lax are suitable for slavery and may even benefit from enslavement).

imported slaves, so that a buyer could choose slaves to match jobs, a female servant for his wife, a male slave for the workshop, negating in turn the need to breed slaves (Lewis, 2016). Garland (1988) maintained that because of physical dispersion from their homelands, ethnic differences across slaves, language barriers, oppression but also co-optation by their masters, and the almost universal acceptance of slavery, chattel slaves did not develop a 'class consciousness', which in turn decreased the risk of uprising.

Legal status. Chattel slave owners had extensive rights over their slaves.⁶ They could choose the jobs of their slaves, hire them out, take their incomes if hired out, whip them, or administer other corporal punishment, chain them, and sexually abuse them. However, masters were not permitted to kill their slaves (to stop them from committing hubris from killing, rather than protecting the slaves; Dillon and Garland, 2013). Slavery was regulated by laws covering among other issues accusations that a person was a slave or a slave descendent (and therefore excluded from citizenship rights), multiple owners claiming the same slave, liabilities of slaveowners for damages caused by their slaves, compensation for injuries caused by slaves, and manumission of slaves. Courts could accept the testimonies of slaves only if extracted by torture (but only if the slaveowner permitted). On the other hand, by limiting a master's liability for a slave's business debts, the legal system opened opportunities for slaves to develop entrepreneurial skills.

Prices. The extant sources do not provide precise figures about slave prices over time. 'At the end of the fifth century Athens, ... depending on age and skill the range of prices [was] from 50 drachmas for a cheap specimen, up to the exceptional price of 1000, with 200 appearing to be an average price' (Dillon and Garland, 2013: 194). Two hundred drachmas were 'equivalent of 200 hundred days work for a skilled workman in the fifth century ... [a sum equal to] the standard ransom for a hoplite enemy captured in war' (Dillon and Garland, 2013: 183). Scheidel (2005: 11) gives an average slave price of 180 drachma (179 drachmas in 414, and 180 in 355 for a slave mine-worker).⁷ He calculates that using slaves was manifestly cheaper than free labour. In Classical Athens, a 20-year-old slave bought for the equivalent of 200 drachmas (roughly equivalent to 2 tons of wheat) and maintained for 10 years at a cost of 900 kg per year⁸ would cost 9 tons of wheat. On the other hand, a free worker paid the average wage 1–1.5 drachmas per day during the same period would have costed a staggering 26–44 tons of wheat (Scheidel, 2005: 14). Although poor Athenians must have found difficult to buy a slave,⁹ Lewis (2018: 180–88) concludes that it was within the means of the 'average' Athenian farmer to own one or two slaves. All in all, an abundant supply of slaves and low transport costs from Asia to Greece accounted for this (Rihll, 1996).

Numbers. The actual numbers of slaves elude us for lack of records in the sources. Thucydides (8.40.2) writes that fifth century Chios had more slaves than any other Greek city, except for Sparta, but gives no figures. Large numbers of male slaves were occupied in the Athenian silver mines, probably between 10,000 and 35,000 (Lewis, 2016; Osborne, 1995). Inevitably, such numbers of male slaves skewed the sex ratio of the slave population and diminished its reproduction potential. Although slaveholding was widespread, it appears that Athenian slaveholders owned small numbers of slaves. Obviously, wealthy Athenians owned more slaves than poorer citizens, and the latter often worked side-by-side with their slaves. Plato (*Republic* 478e) alludes that a very wealthy citizen possesses 50 slaves,¹⁰ while Aristotle (*Politics* 1252b12) says that the ox serves a poor who cannot afford a slave. Many Athenians were small-size farmers or craftsmen able to maintain only a domestic female slave and tended to rely on family members for seasonal agricultural labour. For the fourth century,

⁶See Economou and Kyriazis (2017) for the development of property rights in Classical Greece.

⁷In comparison, the average drachma price of a cow was 72 (Pritchard, 2015: 34), of a horse was 408 (Pritchard, 2015: 106), and of armour was 75–100 (Pitsoulis, 2011: 98).

⁸This includes 700 kg, the minimalist diet suggested by the Roman soldier, politician, and author Cato the Elder, plus other relevant expenses.

⁹However, in the forensic speech *On the Refusal of a Pension*, the orator Lysias argues that owning slaves was beyond the means of poor Athenians.

¹⁰See Cartledge (1985: 31–32) for the exceptionally large numbers of slaves held by only a few wealthy Athenians.

Hansen (1999: 93) estimated 100,000 free citizens (with adult men at 30,000), 20,000 *metics* (resident aliens), and a maximum of 150,000 slaves, with their number fluctuating depending on the fortunes of the polis. Bresson (2016: 459) suggests that slave population of Athens stood at 40–50% of the total, while for the late fourth century, Ober (2015: 92) maintains a figure of 80,000 slaves, approximately one-third of the Athenian population.

Occupations. Slaves were used in mining, agriculture, milling, pottery, workshops, and domestic services; they could do menial jobs, mechanical and repetitive, employed as housekeepers, managers, and tutors, or hired out. Unskilled and cheaper slaves were destined for hard labour in the mines, or the quarries condemned to gruelling and short lives (Braund, 2011). Enslaved girls could be trained as entertainers (dancers or flute players) or end up in brothels. The distribution of slaves across occupations and especially the dependence of agriculture on slave labour is a vexed issue. Jameson (1977) argued that though slave-gangs were absent as there were no large Athenian estates, slaves were used extensively in agriculture, and their labour must have been a critical addition to the work of modest and poor landowners occupying less fertile land that required terracing and trenching. Osborne (1995) suggested that middling farmers were able to harvest their crops without a permanent force of agricultural slaves relying on their family members and domestic service slaves. Regarding slave-pay, the extant sources attest that in the construction of the Acropolis, slaves and free men were paid the same wages for the same type of work. Athens also used a few state-owned slaves as record-keepers, policemen to keep public order, and testers of the purity of silver coins. During military campaigns, slaves served to carry bags and prepare food; when the polis faced an existential threat, they could also be enlisted to fight in exchange for citizenship rights.¹¹

Treatment. Domestic slaves were incorporated in the household (*oikos*), the basic unit of social and economic organisation. Within the household, the slave had only the right to life; being treated well was not a right, but a choice of the master. Nevertheless, masters appreciated that maltreatment resulting in incapacitation or death would waste the slave as an investment. Slaves resisted their masters by faking illness, wandering in the market, working slowly and carelessly, and even stealing their masters' property (Hunt, 2018: 213–214). Owners tried to secure the loyalty and good behaviour of their slaves by disciplining and motivating them. Punishment of slaves could be severe, like withdrawing food, chaining, and whipping. Incentives for good behaviour included extra food and better clothing and allowing slaves to form families.¹² Skilled slaves could live separately from the house of their owners as *choris oikountes* ('living apart'), operate their own business, have their own families, and, in an economically efficient arrangement, pay the master a fixed sum (called *apophora*) and keep the rest of profits.¹³ The 'Old Oligarch' an anti-democratic essay of the early fourth century complained that Athenian slaves lived in luxury and could not be distinguished from free citizens by physical appearance, clothing, tattoos, or other marks. Slaves could eventually be freed by the will of their owner or by buying their freedom.

Seeking a systematic explanation of Greek slavery, Scheidel (2005, 2008) highlighted easy access to slaves and high real cost of free labour. In the archaic period, mass emigration around the Mediterranean opened new markets offering opportunities for enrichment and access to foreign slaves.

¹¹According to Hunt (2018), even though ancient authors tended to downplay their importance during the Classical period, expansion of warfare increased needs for manpower resulting in the recruitment of slaves, both in Athens and Sparta. Lyttkens and Gerding (2022) survey the literature on whether slaves were used as rowers in the Athenian mighty navy, or citizens and mercenaries were sufficiently numerous to man the fleet. As the information available is sparse, the argument is finely balanced, but they conclude that there was no widespread use of slaves as rowers.

¹²For honest servants generally prove more loyal if they have a family' (Xenophon, *Oeconomicus* 9.5) ... and 'those [slaves] who enjoy a share of [the master's] good things are loyal ... and want [the master] to prosper' (Xenophon, *Oeconomicus* 12.7). Similar comments about slave rewards also appear in *Economics* of Aristotle (although the latter was probably authored by a student of his). For an analysis of slaveholders paying more than subsistence, see Fogel and Engerman (1974), Findlay (1975), and Barzel (1977).

¹³The most famous example was the ex-slave banker Pasion who became one of the richest persons in Athens and was eventually granted citizenship.

Scarcity of labour, and henceforth high wages, in the Greek city-states originated not from an abundance of land (a prominent factor when new untapped wealth becomes available after the discovery of new lands, as emphasised by Domar, 1970), but from the unavailability of free citizens. The latter preferred to engage in military and political pursuits instead of taking up manual, 'vulgar' work and dependent employment,¹⁴ limiting the pool of labour willing to be in the employee of others.

Finley's view of a direct relationship between democratic freedoms for some and slavery for others is no longer seen as valid (Lewis, 2018; Osborne, 1995). Large-scale slavery did not originate from the Greek poleis; their slave systems shared similarities with those found throughout the Mediterranean basin. The division between free and slave was a gross simplification as it overlooked significant differences across a range of groups.¹⁵ Nor does slavery drive slaveholders to embrace democracy for themselves; slavery was prevalent in other societies before and after Classical Greece, but they did not establish democracy. Nor is it true that the Athenians had the time to engage in politics because slaves did all the work. Most Athenians had to work for a living, while political activity took only part of their time, and, as in all agrarian societies, Athenian women carried out took a large part of work.¹⁶

Spartan helots

Sparta comprises the classic model of oligarchy (see, e.g., Cartledge, 2013; Dillon and Garland, 2013). It featured an assembly of all Spartan men (peers) who possessed an estate worked by helots, had undergone the rigorous military training system, and made contributions to and participated in the mess common meals. Military service was compulsory and full-time from the age of seven when entering the training system to the age of 60, elevating the Spartan army to the renowned fighting land force of Classical Greece. Compared to Athens, the assembly had severely restricted powers. Two kings reigned simultaneously performing military and religious duties, and shared power with a council of elders (men above the age of 60 years serving for life) that set the policy agenda and could override decisions of the assembly. An annually appointed committee of five ephors had wide executive and judicial powers monitoring the kings, negotiating with foreign envoys, presiding over the assembly, carrying out policy decisions, and supervising the strict educational system.

Origins of helots. Instead of importing slaves, Sparta kept an indigenous population of conquered, self-reproducing, sharecrop-like peasants, called helots.¹⁷ Early in her history, Sparta forced into enslavement the indigenous people of Laconia, the fertile land around Sparta.¹⁸ However, we have no reliable information about their origins or exact date of subjugation. Below the rank of a full Spartan citizen but above the helots stood the *perioekoi* (dwellers-around) occupying marginal land and engaging in crafts. They were obliged to serve in the military but did not have full citizenship rights. Following a protracted military campaign dated 740–720, Sparta conquered Messenia to the

¹⁴However, Silver (2006) challenges the view that free citizens did not offer dependent work on long-term contracts. Similarly, consistent with Hesiod's counsel in *Work and Days* (311) 'Work is no disgrace: it is idleness which is a disgrace', Bitros and Karayiannis (2008) argue that most citizens did not distinguish between noble and menial work.

¹⁵Kamen (2013) divides the Athenian population into 10 statuses of permeable rather than rigid boundaries, namely, chattel slaves, privileged chattel slaves, conditionally freed slaves, metics, privileged metics, 'bastards', disenfranchised citizens, naturalised citizens, female citizens, and male citizens.

¹⁶It may well be thought that it was the work of women even more than that of the slaves that provided the male citizens of Athens with their opportunity to run the political institutions' (Hansen, 1999: 318).

¹⁷As already said, one must be cautious characterising helots as sharecroppers and serfs; such modern terms may fail to convey the ancient reality and lead to erroneous inferences.

¹⁸Looking at the adoption of slavery in Greece, van Wees (2003) argues that war victors simply continued the labour regime of the conquered lands. If large estates worked by types of sharecroppers were the norm, the new masters must have carried collecting agricultural tribute, as for example in Laconia, Messenia, Thessaly, and Elis, as well as pre-Solonian (archaic) Athens. However, that would not have been possible if independent small-holders were commonplace. 'The nature of the pre-conquest regime was surely a key factor in deciding whether a defeated enemy was to be reduced to serfdom or suffer some other fate' (van Wees, 2003: 69).

west of Laconia forcing her population to helotage.¹⁹ The Messenians revolted but were defeated in the so-called Second Messenian War of 650–630. Sparta possessed the most fertile land in the region and a captive labour force. The Messenian lands were divided into estates farmed by the subjugated population for the benefit of the conquerors. According to the poet Tyrtaeus, helots were ‘just like donkeys oppressed with great burdens, bringing to their masters of grievous necessity half of all the produce their lands bears’ (quoted by Dillon and Garland, 2013: 230). The Spartan domination of the Messenian helots lasted for more than three centuries.

Legal status. Helots were privately owned but as various restrictions applied, ownership displayed some communal characteristics. Masters were not allowed to sell their helots outside the boundaries of Sparta, a prohibition that in addition to its ideological and political aims secured the availability of a labour force to work in the estates (van Wees, 2003: 70). Helots could also be commandeered by Spartans other than their owners without the permission of the latter, they could be beaten by others than their owners, could be recruited as soldiers, and could only be manumitted by the state rather than private acts. Freed helots, called *neodamodeis*, did not enjoy full citizen rights but had a status like the *perioekoi*. Helots formed their own families, kept kinship ties, and could own some personal items. Although they were not free to move, ‘there is no evidence that the helots were “bound to the soil” in the same way as serfs’ (Lewis, 2015: 10). Messenian helots lived in their own communities, while Laconian helots lived in small groups on Spartan estates.

Numbers. Again, there is precious little information about helot numbers, but historians agree that they outnumbered their masters. Compared to Athens, Plato (Alcibiades, 1.122d) says that the Spartan estates had more slaves than Athenian ones (as well as better soil and more horses). Cartledge (1987: 174–75) put their number at 100,000 vis-à-vis 10,000 full-time Spartan warriors. The historian Herodotus gives a figure of 35,000 male helots accompanying 5,000 Spartan hoplites in the 479 Battle of Plataea against the Persians. Scheidel (2003) casts serious doubt on the ratio 7:1; based on the carrying capacity of the Spartan lands and nutritional needs, he puts the number of adult male helots in the early fifth century at 30,000 at a ratio of 4:1 to male Spartans.

Occupations. The distinctive feature of helots was agricultural labour. They cultivated the land growing food handing a certain proportion of the output²⁰ to their Spartan masters who lived in Sparta rather than in their estates. Spartan masters used the proceeds to contribute to the common meals taken in the messes, and freed from the need to work could devote their time to hunting, military training, and civic affairs.²¹ Helots also accompanied Spartans as light-armed auxiliaries in military campaigns.

Treatment. Spartans always feared a revolt from the more numerous helots. To prevent it, they devoted themselves to full-time military service and operated mechanisms of strict surveillance and harsh controls, so that their treatment of the helots ‘was a byword for cruelty in antiquity’ (Lewis, 2021: 3). Every year Sparta was declaring war against the helots, so that their killers would not cause religious pollution from murder. In addition, declaration of war perpetuated the notion of Sparta dominating her slaves by virtue of military conquest (Luraghi, 2002). Harsh and cruel

¹⁹Scrutinising the wording of the ancient authors, Luraghi (2002) doubts that at the time of the Spartan conquest, the Messenian helots were a homogeneous group. He speculates that, not unlike pre-Solonian Athens, ‘helotry originated by regulating and making permanent the condition of different kinds of [Laconian] unfree or free and impoverished labourers’ (243).

²⁰Historians conclude that during the Classical era, helots paid half of the output to their masters, while during the Hellenistic times, in a much diminished and sparsely populated Sparta, masters received a fixed payment. Payment of a proportion of output instead of a fixed rent shared the risk of crop failure and food shortage between the master and the helot, an arrangement that protected the helot from the threat of having nothing left in a year of bad harvest (Hodkinson, 1992). Cheung (1968) showed that when there is uncertainty about the agricultural output, sharecropping emerges as an efficient mechanism for risk sharing between the landlord and the tenant, while Reid (1976) pointed out that sharecropping would be more frequent when there is less economic uncertainty and entrepreneurship is relatively unimportant. Investigation of the optimality and durability of the sharing arrangement between Spartans and helots is left for future research.

²¹Fleck and Hanssen (2009) explain that Spartan men’s full-time military service also accounts for, unparalleled in Ancient Greece, granting property rights to Spartan women.

punishments like flogging were not uncommon. Helots were also subject to humiliating treatment like being forced to drink unmixed wine (the Greeks diluted their wine with water) to imprint to young Spartans the inappropriateness of drunkenness; they were also forced to lament the death of their masters, a role played elsewhere by slaves. Part of the training of young Spartans included the *krypteia* consisting of forming bands that under cover of the night killed any helot they caught, while also targeting strong, muscular helots.²² Lewis (2021) argues that there is no evidence that the Spartans micro-managed the helots, although an ideology of contempt led to treat prominent members of their community with extreme brutality. By way of example, Thucydides (4.80.2–5) reports that (some time before 424) the Spartans promised to free helots who had distinguished themselves in war serving with Sparta. Calculating that those who came forward were ‘most high-spirited, and most likely to rise against their masters’, in an act of ‘outstanding brutality’ they selected 2000 and massacred them.

Although Spartan helots are the best-known example of non-chattel Greek slavery, they were not unique (van Wees, 2003). In the archaic period, several other Greek city-states also acquired serf-like Greek populations by conquest, like the *penestai* of Thessaly, the *woikeis* of Crete, the ‘*katōnakē*-wearers’ of Sikyon, and the ‘naked people’ of Argos. Greek colonists in Syracuse, Byzantium, Heraclea on Black Sea, and Cyrene also reduced to serfdom-like status indigenous, ‘barbarian’, populations, although following revolts and loss of conquered territory surviving labourers were enfranchised.²³

An economic model of slavery regimes

We assume a setting where the decision to use slaves has already been made and focus on the choice of slavery regime. The master M and slave S engage in a two-stage game. At the start of the game, the master chooses the slavery regime, harsh H or soft O . Harsh slavery amounts to low slave-pay, humiliating and violent treatment of the slave, and borrowing from Fenoaltea, it relates to effort-intensive activities. On the contrary, care-intensive activities adhere to a soft regime where production requires labour’s deft application and allows the slave some discretion over his conduct. To incentivise the slave to work harder and increase output, the master may provide the slave with high pay and other favours, with manumission being the ultimate reward. Observing the type of regime, the slave chooses whether to acquiesce to master’s orders, an action denoted by A , or oppose the regime, which takes the form of revolting against the harsh master or running away from the soft regime, an action denoted by R . The payoffs from the different outcomes are denoted by U_{jk}^i , where $i = M, S$ denotes the player, $j = H, O$ denotes the slavery regime, and $k = A, R$ denotes the action of the slave. If the slave acquiesces to harsh slavery, he is paid a sum X .²⁴ The slave then produces income Y for the master, who incurs a cost of G to guard the slave; for concreteness G is assumed as determined by the production technology. The payoffs of the slave and the master, respectively, are

$$U_{HA}^S = X \quad (1)$$

$$U_{HA}^M = Y - X - G \quad (2)$$

By assumption $U_{HA}^M > 0$, which requires $Y > X + G$. If the slave revolts at a cost of effort T , he wins his freedom valued at F with a probability P , but if the revolt fails, he is punished resulting in utility $-F$. Regardless of winning or failing, when the slave revolts, and despite the outlay of G , the income of the

²²Permission to kill a helot, resulting in destroying a productive asset, signified that security, a public good, trumped up the benefit of a private good. I owe this point to an anonymous referee.

²³It bears noting that Athens also exploited her allies by levying tribute and setting up cleruchies, grants of land to poor Athenians in territories outside Attica controlled by Athens. Comparison of those arrangements with slavery is left for future research.

²⁴The insights from the model remain the same if slave-pay is expressed as a proportion of income, $X = \rho Y$.

master falls to zero. The respective payoffs of the slave and the master are

$$U_{HR}^S = PF - (1 - P)F - T \text{ or } U_{HR}^S = (2P - 1)F - T \quad (3)$$

$$U_{HR}^M = -G \quad (4)$$

The former is negative when the probability of a successful uprising is less than 1/2.²⁵ Obviously, the master is better off when the slave acquiesces. For the slave to acquiesce to a harsh regime, it must be $U_{HA}^S \geq U_{HR}^S$ which requires that the master pays the slave a sum X that satisfies the constraint

$$X \geq (2P - 1)F - T \equiv X_0 \quad (5)$$

The above shows the incentive compatibility constraint of the slave, or revolt constraint faced by the master. Obviously, the tighter the master's control on the slave, the lower the probability of the latter breaking free.

Under the laxer regime of soft slavery when the slave acquiesces, he delivers to the master an extra income $y > 0$, so that the master receives $Y(1 + y)$, while it costs the master C to control him, where, as before, C is determined by the production technology. Let $w > 0$ denote the extra income the master pays the slave, so that the slave gets $W = (1 + w)X$. For concreteness, we further assume that the extra output y varies positively with the extra payment w according to the formula $y = \gamma/(1 - w)$, where γ is a positive productivity parameter. The payoffs of the slave and the master are then

$$U_{OA}^S = W \quad (6)$$

$$U_{OA}^M = (1 + y)Y - W - C \quad (7)$$

Maximising $U_{OA}^M = (1 + (\gamma/(1 - w)))Y - X(1 + w) - C$ with respect to w yields $w^* = 1 - \sqrt{\gamma Y/X}$. The equilibrium slave-pay, extra output, and master's payoff are, respectively,

$$W^* = 2X - \sqrt{\gamma XY}; \quad y^* = \sqrt{\frac{\gamma X}{Y}}; \quad U_{OA}^{M*} = Y - 2X + 2\sqrt{\gamma XY} - C \quad (8)$$

If the slave tries to run away at a cost of effort E , the master gets nothing, while the slave wins his freedom of value F with a probability Q . Again, if he fails to escape, he is punished, and his utility is $-F$. The corresponding payoffs are

$$U_{OR}^S = QF - (1 - Q)F - E \text{ or } U_{OR}^S = (2Q - 1)F - E \quad (9)$$

$$U_{OR}^M = -C \quad (10)$$

Again, $U_{OR}^S > 0$, only when $Q > (1/2)$. For the slave to acquiesce in the soft slavery regime, it must be $U_{OA}^S \geq U_{OR}^S$, which requires

$$W \geq (2Q - 1)F - E \equiv W_0 \quad (11)$$

²⁵Endogenising the probability of slave revolt complicates the algebra without a commensurate gain in intuition (proofs available on request).

As in (5), the latter represents the incentive compatibility constraint of the slave under soft slavery. For consistency, it is also assumed that $T - E > 2(P - Q)$ so that $W_0 > X_0$. The game and the payoffs associated with the various outcomes are shown graphically in Figure 1.

Conditional on the slave acquiescing, the master chooses a soft (harsh) slavery regime when $U_{OA}^M > (<) U_{HA}^M$. From (2) and (8), the difference in the master payoffs is

$$\Delta \equiv U_{OA}^{M*} - U_{HA}^M = 2\sqrt{\gamma XY} - X - (C - G) \quad (12)$$

The quantity $2\sqrt{\gamma XY} - X$ captures the output part of the slavery choice, while the difference $C - G$ represents the control costs of the choice. Thence,

$$\Delta > (<) 0 \quad \text{for } X^2 - 2(2\gamma Y - (C - G))X + (C - G)^2 < (>) 0 \quad (12')$$

Solving the quadratic expression gives $X = 2\gamma Y - (C - G) \pm 2\gamma Y \sqrt{1 - ((C - G)/\gamma Y)}$. Using the approximation $\sqrt{1 + px + qx^2} \cong 1 + (p/2)x + 1/2(q - (p^2/4))x^2$ with $p = 1$, $q = 0$, and $x = (C - G)/\gamma Y$, we obtain the roots

$$X_1 = \frac{(C - G)^2}{4\gamma Y} \quad \text{and} \quad X_2 = 2(2\gamma Y - (C - G)) - \frac{(C - G)^2}{4\gamma Y} \quad (12'')$$

They represent the threshold points of switching from one system to the other. Although at this level of generality the roots cannot be signed unambiguously, we proceed by assuming the most general and interesting case $0 < X_1 < X_2$, which yields

$$\Delta < 0 \quad \text{for } 0 < X < X_1 \text{ and } X_2 < X \quad (13)$$

$$\Delta > 0 \quad \text{for } X_1 < X < X_2 \quad (14)$$

Provided that X and W are large enough so that the slave acquiesces under both regimes, the predictions from (13) and (14) are: harsh slavery is instituted if the slave-pay X is very low, below the X_1 threshold, so that the master has no incentive to increase pay for obtaining more output, or very high, above the X_2 ceiling, implying that increasing slave-pay to obtain more output is no longer profitable. On the other hand, soft slavery is adopted for intermediate values of slave-pay. It follows that soft slavery is more likely when the exogenous variables imply a large (X_2, X_1) interval shown in

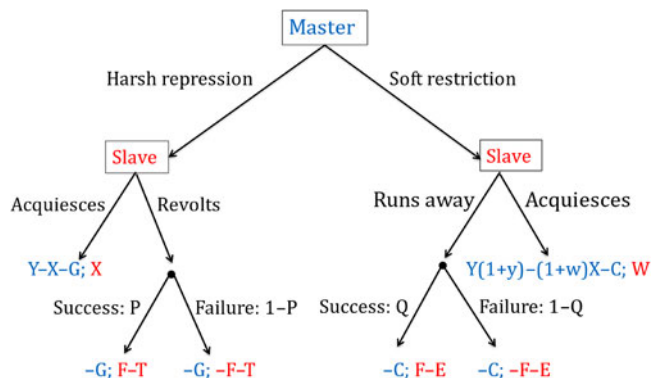


Figure 1. Slavery regimes and payoffs.

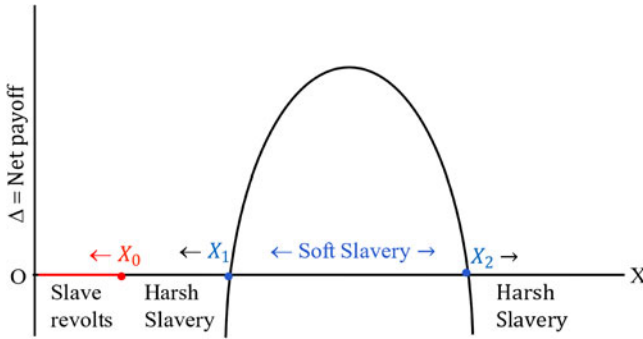


Figure 2. Soft versus harsh slavery.

Figure 2. Probing into the latter interval, we have

$$X_2 - X_1 = 2 \left(2\gamma Y - (C - G) - \frac{(C - G)^2}{4\gamma Y} \right) \quad (15)$$

Its comparative static properties are

$$\frac{d(X_2 - X_1)}{dY} = 4\gamma + \frac{(C - G)^2}{2\gamma Y^2} > 0 \quad (16)$$

$$\frac{d(X_2 - X_1)}{d\gamma} = 4Y + \frac{(C - G)^2}{2\gamma^2 Y} > 0 \quad (17)$$

$$\frac{d(X_2 - X_1)}{dC} > (<) 0 \quad \text{for } G > (<) C + 4\gamma Y \equiv \bar{G} \quad (18)$$

$$\frac{d(X_2 - X_1)}{dG} > (<) 0 \quad \text{for } \bar{G} \equiv C + 4\gamma Y > (<) G \quad (19)$$

Therefore, masters are more likely to institute a soft slavery regime: (1) the larger the size of income generated by slavery Y . (2) The greater the output rise γ from higher slave-pay. (3) The smaller the cost of guarding a slave under soft slavery C , when G is smaller than the threshold \bar{G} . (4) The larger the cost of guarding a slave under harsh slavery G when G is above the threshold \bar{G} .

Towards an explanation of the different slavery regimes

Two broad predictions follow from the model. First, when the incentive compatibility constraints (5) and (11), which depend on the probabilities P and Q , are satisfied, the slave acquiesces. Second, masters establish the most profitable regime depending on slave productivity and cost of controlling slaves as captured by the set of equations (15)–(19). These are now discussed in detail.

Risk of slave revolt

Hunt (2018) argues that in the Greek (and Roman) antiquity, slaves would revolt when they were a large proportion of the population, they were alienated from their masters, they could get organised,

and the ruling class was divided. The previous analysis suggests that only the first condition was present in both Athens and Sparta, while alienation of slaves from their masters was probably more pronounced in Sparta. Note that most probably, the value of freedom F varied across different slaves. Specifically, a non-Greek escapee in Attica faced grave difficulties when trying to return home because of distance, linguistic, and cultural differences across the territories covered in journeying, not to mention the risk of recapture. This implies a low value of F . On the other hand, for the ethnically homogenous helots aspiring to regain what they considered their own physical and social environment, the value of F was high.

In Athens, chattel slaves could try to escape as isolated individuals in small numbers. Professional slavecatchers were deployed to counter the risk of a slave flight. But an organised large-scale flight or even revolt was almost forbiddingly difficult given the diverse demographic, cultural and linguistic make-up of slaves. The implication is that a low Q value (below $1/2$) characterised Athenian chattels. There is only a single example of mass escape. In 413, during the Peloponnesian War, the Spartans occupied Deceleia a village at the North of Athens cutting off the urban area from much of her agricultural hinterland. The Athenian economy suffered great damage as delivery of cereals to the urban centre was re-routed, and because 'more than twenty thousand slaves had deserted, a great part of them artisans' (Thucydides 7.27).²⁶ The implication is that mass flight was possible only when exogenous factors increased the probability of escape.

However, Sparta faced an ever-present risk that the subjugated homogenous Messenian helots could revolt (Cartledge, 1985) implying *ceteris paribus* a high P value. In addition to the strict security measures described above, the risk of rebellion was partly addressed by a type of divide-and-rule policy, where wealthier helots collaborated with Spartans to preserve private benefits to dominate communal activities making them interested in preserving the status-quo (Hodkinson, 2003). Similarly, the presence of *perioekoi* provided a further buffer between Spartans and helots. Nevertheless, two large-scale revolts took place. In 464 BCE following a massive earthquake, an uprising of Messenians helots threatened the very survival of the Spartan system of government. It probably took Spartans a decade to defeat the rebels. Surviving rebels, helped by Athens, settled in Naupactus on the North shore of the Corinthian Gulf. The second revolt marked the end of Spartan rule of Messenia. In 370, after defeat by Thebes, Sparta was worried about a Theban invasion. An offer was made to helots to enlist in return for their freedom. Six thousand helots volunteered. Fearing that such a force posed a bigger threat, the Spartans withdrew the offer. With the help of the invading Thebans, the Messenian helots revolted and won their freedom. They subsequently founded the New Messene a new walled city (as opposed to unwallled Sparta). Again, it was exogenous influences that increased the probability of a successful helot uprising.

Output differential, effort, and care intensity

The alluvial fertile lands of Laconia and Messenia controlled by Sparta were suitable for the cultivation of annual crops like cereals (Fleck and Hanssen, 2006 and references therein) implying that large levels of output could be secured by coerced effort-intensive labour. On the other hand, the broken, rocky, dry terrain of Athens was less suitable for cereals and especially wheat. Population pressures in Athens forced poorer farmers (working along with their slaves if they could afford them) to cultivate poorer and even marginal land by terracing and irrigating plots, and planting legumes and vegetables as alternatives to grain. Nevertheless, the Attican soil was more appropriate for perennial crops like olives and vines than for cereals (Hanson, 1999). But growing olives and grapes are almost par excellence care-intensive activities, not only for the long time it takes for the plants to mature but also for the attention needed throughout the year. Compared to cereals, whether the olive trees and the vines were tended carefully was more difficult to ascertain implying that masters needed to motivate their slaves to spend the appropriate effort,

²⁶Their respite was only temporary; they were captured by the Boeotians and sold again as slaves (Finley, 1959: 159).

and thence slaves enjoyed more discretion.²⁷ No wonder then that during the Classical era, Athens imported most of the wheat needed to cover her needs and exported olive oil. In addition, consistent with the model predictions, Thessaly, Crete, and Sicyon characterised by helot-type slavery are also located in rich plains specialising in cereal production.

On the other hand, Athenian handicraft, manufacturing, and services like banking could not have flourished unless the skilled slaves labouring in such activities were kindly treated and generously rewarded. In terms of the model, in Athens the size of Y was small but that of γ was large implying high extra output from rewarding slave labour with extra pay w to secure extra output y . On the contrary, in Sparta the size of Y was large and that of γ was small, in the sense that little additional output, if any, could be derived by a kinder treatment of slaves.

Obviously, not all Athenian slaves were occupied in care-intensive activities. Slaves in the silver mines of Laurion, where the size of output depended on backbreaking effort, lived a hard, brutal, and rather short life. As there are no records of manumitted mining slaves (Jameson, 2002), we may infer that, consistent with the model predictions, masters had no reason to motivate slaves with better living conditions and the prospect of the ultimate reward of manumission.

Cost of guarding slaves

When guarding slaves is characterised by economies of scale, as for example when a single guard can oversee two dozen slaves as easily as a single slave, each master benefits by sharing the cost of controlling slaves with the rest of the slaveholders. This was the case in Sparta not only because of the military organisation of the society but also because of the element of communal rather than purely private ownership of the helots. That is, socialisation of the cost of policing helots improved the profitability of using them. That element was missing from Athens. However, by holding slaves from different backgrounds, the Athenians decreased the potential of slave cooperation against their masters. Furthermore, granting some freedoms and incorporating them into the household unit reduced somehow the cost of keeping constant watch. We may then infer that for Athens it was $C < G$, but the reverse was true for Sparta, meaning that in Athens soft slavery was cheaper and thence more profitable, but the reverse held for Sparta.

Conclusions

Debates about democracy *versus* slavery, respectively 'good' and 'bad' aspects of Classical Greece, will always be wrapped in ideological principles and moral compunctions, and may not be settled unequivocally. More modestly, granted the initial conditions of the Archaic Ages, Spartan conquest of Messenia and Solonian reforms in Athens, this work explored why during the Classical period Athens and Sparta developed contrasting slavery systems. The Athenians bought foreign-born slaves and matched them to different occupations; the Spartans took advantage of the conquered helots who worked the land. Treatment of Athenian chattel slaves differed across different activities, being brutal at the silver mines but kinder at activities requiring the care of the slave labourers. Treatment of the helots was harsh aiming to inspire fear and intensify work effort. Considering that the ruling class applies the most profitable regime, the differences between the slavery systems of Athens and Sparta were attributed to differences in the potential of successful slave resistance either through escape or revolt, differences in the incentives provided to the slaves to increase output, which in turn depended on the fertility of the land and corresponding production activities, and differences in the cost of controlling slaves, which depended on the military organisation of the societies of slaveholders.

²⁷Gangs driven by the lash are inappropriate for the continuous care needed by trees and vines, longer-lived than field crops and for the equipment for processing and storing the product...Cereal culture of annual crops requiring less equipment and attention might be expected to foster a more brutal approach by masters and overseers' (Jameson, 2002: 172).

As a corollary, the contrasting slavery regimes comprise a continuum of modes. The ruling classes of different city-states facing different domestic and external circumstances, and different production endowments opted for the slavery regime best suiting them. This conclusion corroborates and formalises Lewis' view (2018: 165) that the systems of chattel slaves of Athens and helots in Sparta were 'not categorically different, but simply epichoric slave systems attuned to local economic and institutional needs'.

The analysis further suggests that the link between Ancient Greek democratic freedom and slavery, identified by Finley, was one of the correlation rather than causation. At a fundamental level, differences in geography and initial political conditions account for both the different political and slavery institutions of democratic Athens and oligarchic Sparta.

Finally, from a methodological perspective, the study shows that invoking formal micro-foundations for the analysis of the ancient economy allows us to gain a more accurate picture of its character and explain better the choices made in its environment.

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