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Between Burkina Faso and Brazil?

Measuring institutional quality in ancient Athens

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Abstract

We use the Economic Freedom Index (Gwartney, Lawson and Norton 2008) to characterise the institutions of ancient Athens in the fourth century B.C. We find that ancient Athens places itself at the top of the league in terms of economic freedom when compared with current societies. It is increasingly being recognized that ancient Greece witnessed improved living conditions for an extended period of time. Athens in the Classical period appears to fare particularly well. Studies of contemporary societies show that institutional quality is an important determinant of economic growth. It is then perhaps not surprising that Athens ranks not between Burkina Faso and Brazil, as one might have expected, but instead is better than both Belgium and Britain.

JEL: N43, N93; O17, P52

Keywords: institutions; quality; growth; ancient Athens

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1. Introduction

This paper uses the Economic Freedom Index to compare the institutional set-up of ancient Athens in the classical period to modern economies. As it appears that ancient Greece experienced significant economic growth, it is interesting to note that the institutional set-up likely is an important contributory factor.¹ The level of economic freedom in Athens in the fourth century B.C. is on level with contemporary Singapore and Hong Kong.

Our investigation is motivated by several facts. Firstly, Morris (2004; 2005) suggests that real income per capita in ancient Greece increases by 50-100% in the period 800-300 B.C. This means that economic growth outpace an almost ten-fold increase in population and represents a yearly per capita growth of 0.07-0.14%.² For example, Morris estimates that the median Greek house increases in size by 350% during the period. Ancient Greek society is also highly urbanised according to Hansen (2006). There are indications that the health of the population increases and that the ancient Greeks reach historically high levels of physical well-being (Kron, 2005; Morris, 2004; Ober, 2010), though the evidence is not strong Scheidel (2010a).

Athens is probably particularly successful. Scheidel (2010b) estimates that the real daily wage in Athens increases from 8-9 litres of wheat in the late fifth century to 13-16 litres in the late fourth century, i.e., by some 50 – 100 percent.³ Ober (2008, chapter 2) argues that the Athenians outdo their rivals in terms of prosperity, measured as aggregate material flourishing or its constituent parts: fame, territory size, international activity, public building,⁴ and furthermore that this material success is not restricted to the periods of Athenian imperial power.

Secondly, from 700 B.C. and onwards, fundamental institutional changes occur in the Greek city-states (*poleis*). Several *poleis* introduce democratising measures and Athens famously develops into what is, for its male citizens, a far-reaching direct democracy.⁵ From 508/7 and through the fifth and fourth centuries, Athenian political, judicial and economic institutions undergo a metamorphosis (cf. section 3, Item 2a).

Thirdly, among the potential determinants of economic growth, considerable attention is now directed towards institutional factors. The institutional structure in a society provides the rules of

¹ We principally prefer writing in the present tense and do so also when we deal with ancient Athens. We cannot conceive of this as causing any temporal confusion among our readers.

² Ober (2010) argues that a likely figure is 0.15% yearly growth in per capita income.

³ Another indication of Athenian prosperity is that the Athenian fleet expanded during the fourth century, according to Hansen (1999, p. 111) from 100 ships in the first decade to 400 in the age of Demosthenes. This is a distinctly expensive undertaking.

⁴ Athens did not, however, have the largest territory.

⁵ Women, foreigners and slaves were excluded from political and (partly) judicial rights.

the game and, by shaping incentives, determines economic performance North (1981; 1990). Even if potentially efficient institutions are in place, they do not necessarily lead to efficient economic activity, however, because a state strong enough to protect property rights is also strong enough to abuse them. Hence the potential for the state to make credible commitments has increasingly been emphasised North and Weingast (1989), a problem that can potentially be solved by political institutional change (Acemoglu and Robinson, 2006). Consequently it is now often argued that there is a complex interplay between economic development and democratisation, with institutional change as a crucial factor (Greif, 2005).

Fourthly, to empirically investigate the relationship between the quality of institutions, income and democracy, summary measures of institutional quality and democratisation are increasingly being used. For example, economic institutions are often measured by the Economic Freedom of the World Index and the International Country Risk Guide, political institutions by the Freedom House Political Rights Index and the composite Polity index, and globalisation by the KOF-index introduced by Dreher (2006).

Against this background, it is irresistible to apply a measure of institutional quality to the society of the Athenians in the Classical period. We chose the Economic Freedom Index for this exercise (we will return to measures of democracy and globalisation in upcoming papers). The question is whether ancient Athens should indeed be placed between contemporary Burkina Faso and Brazil, as one might perhaps expect, or whether institutional quality is yet another area where the ancient Greek city-state is exceptional for its time.

Incidentally, this study fills a gap in the currently expanding literature which focuses on the quantification of different structural aspects of the ancient societies, such as inequality (Foxhall, 1992; 2002 ; Melanovic, 2007; Ober, 2010; Osborne, 1992)), wealth (Kron, 1996; Ober, 2008; 2010) or the level of prosperity compared to other historical periods (Ober, 2010; Scheidel, 2010b).

This quantification of institutional quality in ancient Athens (on the scale of modern societies) can be seen as a way to operationalize Ober's (2010) argument that institutions are important factors in the relative success of the Athenians. Ober suggests that Classical Athens benefits from egalitarian *polis* institutions that encourage human capital formation and reduce transaction costs (standardized weights and measures, standardised and publicly available laws etc.). Furthermore inter-polis competition encourages institutional innovation and imitation.

2. The Economic Freedom of the World Index

The Economic Freedom of the World Index by Gwartney et al. (2008) consists of five dimensions representing various aspects of economic freedom. Granted, economic freedom is not a well-defined concept, but the economic freedom index has nevertheless often been used to quantify different aspects of institutional quality in a way that is relatively comparable both over time and between countries. The five dimensions are:

1. Size of Government: Expenditures, Taxes, and Enterprise
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.

Each dimension consists of several components that are weighed together and assigned a score between 0 and 10. The aggregated economic freedom is the average of the score in the five dimensions (equally weighted).

In cross-country regressions, the economic freedom index has repeatedly been found to be highly correlated with growth, as indicated in the meta-study by Doucouliagos and Ulubasoglu (2006). Several results concern the mechanisms by which institutions foster growth. Abdiweli (2003) has reviewed existing evidence and confirms with own research that judicial efficiency, low levels of corruption, well-organized public bureaucracy and well-defined private ownership co-varies with high levels of growth. Berggren and Jordahl (2005) find that the second dimension, measuring property rights and the integrity of the legal system, is the dimension most robustly related to growth. Bjornskov and Foss (2008) show using the economic freedom index that the size of government (dimension one) and sound money (dimension three) is correlated with entrepreneurial activity.

Furthermore, there is also some evidence that the association between economic freedom and growth is causal in the sense that institutions cause growth, rather than the other way round – see for example Heckelman (2000), Dawson (2003) and Justesen (2008).⁶

⁶ For example, Justesen (2008) find that some (but not all) aspects of economic freedom affect economic growth and investment, and that there is only weak evidence that growth affects economic freedom. Note, however, that de Haan and Sturm (2000) examine the average growth rate of GDP per capita over the 1975–1990 period and find a robust relationship with growth for changes in economic freedom but not for levels. The implications of this finding for our study of ancient Greece are relatively unobtrusive

The index is available for over a hundred countries for every fifth year starting in 1970, and since 2000 it is updated yearly. The index can be downloaded from www.freetheworld.com, which also contains a list of numerous research papers using the index.

We will describe the index and its components in more detail as we now proceed to quantifying the economic institutions of ancient Greece.

3. Measuring ancient Athens

We investigate institutional quality in Athens in the Classical period (480-322 B.C.). However substantial changes take place during these two centuries, for example, in connection with the restoration of democracy in the years following the defeat in the Peloponnesian War, cf. Hansen (1999). We will focus on the fourth century and in particular on the middle of that century. The greatest period of Attic rhetoric begins in 355 and for the following decades we have an unparalleled number of sources for Athenian public life, such as the speeches of Aischines, Demosthenes and others, as well as the writings of Aristotle and his school. The choice of Athens among the different *poleis* is obvious both because of the superior information available and because of the relative success of the Athenians.

Judging by the increase in the real wage suggested by Scheidel (2010b), economic growth is particularly prominent in this period. Furthermore it is likely that the institutions of the Athenians are particularly important in the fourth century. During much of the fifth century the Athenians benefit substantially from their so called “Empire”.⁷ Some important changes in economic legislation take place towards the end of the fourth century.

To quantify institutions in ancient Greece, we look closely at the various components of the five dimensions that make up the economic freedom index. To calibrate our quantification, we check the score against various contemporary reference countries. The use of reference countries allows us to ‘anchor’ the quantification to well-known situations in modern countries. For example, if freedom to trade in ancient Greece can reasonable be described as at least as high as in the United States today, the score for ancient Greece in the fourth dimension should be at least as high as it is for the USA today. As will be seen, we are in some instances still looking for good reference countries.

⁷ A misnomer according to Morris (2009).

In five tables that follow, we characterize institutions in Athens in the five different dimensions of the index. We also report the reference countries used to translate the characteristics of ancient Athens into a 0-10 score. Sometimes it seems reasonable to suggest a range for scores in the Index. Thus our empirical estimates sometimes entail a sensitivity analysis, which also translates into a range for the Index score. In the interest of brevity, we have chosen to rely on a limited number of secondary sources (and some primary). This means that we intentionally ignore many controversies regarding specific details in Athenian history – we believe that these controversies have little impact on the overall Athenian score. For the interpretation of any figures below, note that according to the Attic standard 6 obols = 1 drachma, 100 drachmas = 1 mina, 60 minae = 1 talent. The daily wage is (assumed to be) 1 drachma in the middle of the fourth century (cf. below).

3.1 Size of government

Clearly, the Athenians score very high on the first dimension in the Index. Taxes are low and government enterprises are few. Consequently government activities are a small part of the economy.

Item 1a: government consumption

A tentative overview of Athenian public finance is provided in the Appendix. The upper limit for government consumption is normally total public revenue (but see below). Around 340 B.C., public revenue amounts to 400 talents in Athens.⁸ This is usually taken as a solid fact, and we treat it as such. This means that the calculations below, which involve considerable guesswork, are firmly anchored in the ancient evidence at least in this dimension.⁹

⁸ Demosthenes 10.38. Public revenue varies considerably through the fourth century because important items are relatively volatile, for example, taxes on exports and imports and transit trade, fees paid by those who lease the publicly owned silver mines, and fines and confiscations in the courts. The figure 400 talents is hopefully somewhat representative for conditions during much of the fourth century. Revenue is reduced to 130 talents shortly before this date (Demosthenes 10.37), presumably in connection with the defeat in the Social War 357-355. Revenue soars to 1,200 talents after 338 (Hansen, 1999, p. 260). Note that in the latter period GDP is presumably also much higher, if calculated in the same way as below, since the corresponding daily wage rises to 1.5-2.5 drachmas, cf. Loomis (1998). The recovery after 355 is associated with the administration of Euboulos and the later increase with that of Lykourgos. Note that domestic revenue (i.e., excluding the imperial tribute) is 400 talents in the beginning of the Peloponnesian War, cf. Isager and Hansen (1975).

⁹ Cp. Archimedes: “Give me a place to stand on and I will move the earth”.

Table 1: Classification of fourth century Athens in the Economic Freedom Index

1. Size of government	Athens score	Comments
1a. Government consumption as a percentage of total consumption	10 [8.9, 10]	Baseline = 4.2%. (5.4%, liturgies included) Sensitivity analysis: [1.9, 7.4] or [2.8, 9.0] with liturgies included (GDP (incl. the number of slaves), share of government consumption in government expenditure, share of overall consumption in GDP). Reference: Myanmar with 4.5% scores 10.
1b. Transfers and subsidies as percentage of GDP	9.8 [9.8, 10]	Baseline: 1.1% Sensitivity analysis: [0.4, 1.8] (GDP, theorika, diobelía). With a food crises: maximum 4.4% (but with reduced government consumption). Reference: Thailand with 1.96% scores 9.6.
1c. Government enterprises and investments as percentage of GDP.	10	Baseline = 2.0% Sensitivity analysis: [1.2, 3.4] (GDP, mining revenue). Reference: Countries with shares below 8% are all given the score 10.
1d. Top marginal tax rate	10	
1d.i. Top marginal income tax rate	10	No personal income tax in Athens. Taxes are on wealth, trade and person.
1d.ii. Top marginal income and payroll tax rate	10	No personal income tax and no payroll tax in Athens.
Athens total score on item 1.	10.0	Range [9.7, 10]

The major expenditure items in Athens are military expenses, the costs of running the democracy (assembly pay, pay to councillors and jurors) and some transfers. We do not know how much the Athenians spend on public buildings,¹⁰ water supply, roads etc. In our baseline estimate we assume that 50 talents represent investments¹¹ and that transfers come to 80 talents

¹⁰ We know the building costs of exactly one temple of this period. This is the temple to Asklepios in Epidauros. It is built around 370 B.C. at a cost of 23-24 talents. The Athenian temples are often more difficult to build, and thus more expensive. For example, the Hephaisteion probably costs about 50 talents and the Parthenon much more Burford (1965).

¹¹ Some expenditures are roughly estimated in the literature. Hansen (1999) gives the following figures: Assembly pay 45 talents, expenditures of the Assembly 10 talents, the Council 15 talents, the law courts 23-37 talents. We calculate the support of disabled citizens to perhaps 12 talents and the theorika to perhaps 67 talents (Item 1b). Hansen (1999), p. 316, also suggests that the training of the ephebes cost 25 talents and fodder for horses 40 talents. To this we must add further military expenditures even if we assume peaceful conditions. Adding just one half of Demosthenes' small permanent force (cf., fn. 14) would add 46 talents and bring the total to c. 300 talents, leaving

(Item 2b), leaving c. 270 talents as government consumption. The lower limit for government consumption we take to be 155 talents (retaining the costs of the democratic institutions, the training of ephebes and fodder for horses in the cavalry). The upper limit for government consumption corresponds to a minimum level of transfers (39 talents, cf. Item 1b) and only 25 talents of investments for a total consumption of 336 talents.

Finally, it is likely that part of public expenditures never features in the public accounts. In Classical Greece, it is considered a duty and an honour for rich citizens to contribute to the common good, to perform so called liturgies. Each normal year there are about 100 festival liturgies (Davies 1967), the most well-known being to stage a dramatic production (*choregia*). The trierarchy is a military liturgy – to commission and command a warship for a year. It remains an open question to what extent the liturgies should be seen as a tax. To some extent the system is enforced by social norms, which would place it outside the Index, and there is always an honorific element. However, even if the system started as voluntary, it has largely ceased to be so by the fourth century. Liturgists can be nominated by others and once they are appointed, it is punishable to avoid the obligation.¹² According to Gabrielsen (1994), the Athenians view the trierarchy as a tax (*telos*) and being exempt is denoted *atelia*.

A consequence of this is that we add the cost of liturgies to government consumption as an alternative. A festival liturgy costs between 300 and 3,000 drachmas while known costs of a trierarchy range from 4,000 to 6,000 drachmas.¹³ To be added to government consumption are the costs of 100 festival liturgies and the triarchies. The former represents a total expenditure of – at a guess – 150,000 drachmas or 25 talents. When Athens is not at war, the expenditure of a trierarch is presumably comparatively modest. Say 1,000 drachmas on average for 300 trierarchs, for a total of 50 talents, and an aggregate liturgical expenditure of 75 talents. The figures above represent peace time conditions, which is the relevant situation for the purpose of the Index.¹⁴

100 talents for unspecified investments (inscribing honorary decrees on stone probably cost some 10-20 talents yearly), consumption and savings.

¹² The Athenians use private initiative to ensure that the burden is fairly allocated. Cf., e.g., Lyttkens (1994) and Gabrielsen (1987) on the *antidosis* procedure.

¹³ Davies (1971), pp. XXI-XXIV.

¹⁴ We compare ancient Athens with modern states in peace. Consequently we do not attempt to estimate government consumption when the Athenians are at war. In times of war, government consumption probably increases substantially. Even a small permanent force costs 92 talents per year (Demosthenes 4.28-29), and in times of war the Athenians regularly employ much larger forces. Following Loomis (1998) the pay to foot soldiers and sailors is 1 drachma per day and so, for example, a hoplite force of 6,000 costs a talent a day. In war, transfers and investments in buildings and infrastructure are likely kept to a minimum, allowing 100 talents to be reallocated to the military sphere. Furthermore, a special tax on wealth – the *eisphora* – is levied, raising some 60-120 talents (Lyttkens, 1992). Finally, trierarchs spend perhaps 6,000 drachmas each, adding 300 talents to government consumption. At the same time, however, the revenue from the harbour tax must suffer, at least by 50 talents is our guess. Finally,

We also need an estimate of overall consumption. This roughly equals GDP less investments and savings. The notion that there were no consciously made productive investments in Classical Greece has been disproved.¹⁵ Individuals also often resorted to hoarding, placing money in temples for safe-keeping etc. However, we have no way of knowing the size of investments and savings. Our somewhat arbitrary baseline assumption regarding overall consumption is 85% of GDP (including both private and public consumption). We assume that the lower limit for overall consumption is 80% of GDP and the upper limit is 90%.

This brings us to an estimate of GDP, which is however a difficult (read impossible) task if one hopes for accuracy. Goldsmith (1987) suggests a GDP around 5,000 talents, a figure obtained by multiplying the labour force (140,000) with the average wage (1 drachma) and the number of working days (250). Note that slaves famously were paid just as much as free men, cf., e.g., Loomis (1998).¹⁶ Given the problems involved when estimating GDP in today's developing countries, vividly described by Deaton (1995), such a crude method may well be defended.

With the same method, but adjusting the population figures to that of Hansen (1999), pp. 92-94, we estimate a baseline GDP of c. 7,500 talents. We assume 30,000 free adult male citizens, 30,000 female citizens, 40,000 metics (half female), i.e. resident foreigners, and 150,000 slaves. We assume that the number of working days is 195 (Hansen, op. cit., 186), but that slaves work 300 days.

With respect to the number of slaves, not much is known in reliable detail. We follow the salutary comment of Hansen (1999), p. 93, that the Athenians themselves do not know the number of slaves, only that there are more slaves than free in Attica. This gives at least a lower limit for the number of slaves – c. 100,000 – and we use 150,000 as our baseline estimate and 200,000 as an upper limit. We assume that 1/3 of the slaves do household work and therefore do not count in GDP.

We assume in our baseline that 5,000 (metic) women work outside the household (195 days). There must be such a group since the Athenians have a special metic tax (*metoikion*) that only applies to men and independent women (Andreades, 1979[1933], p. 278).

peace is relevant for the index, as argued above, but otherwise a reading of the events of the fourth century does not convince the reader that peace – rather than war – is the normal situation for the Athenians. “From the end of the fifth century to the middle of the fourth, Athens was a society at war, relieved by occasional short periods of peace” (Hansen (1999), p. 116).

¹⁵ Land was being bought as an investment to improve and resell (Xenophon, *Oeconomicus* XX. 22-26), and deliberate investment for profit becomes visible in the form of urban rental property, cf. Davies (2007), p. 357.

¹⁶ To be precise Goldsmith uses 5 obols rather than 1 drachma to account for the fact that some slaves worked in households. From the expenditure side Goldsmith calculates a GDP of 4,000 talents, and Amemiya (2007) suggests 4430 talents.

We use 1 drachma as an average daily wage, which is conventional and seems reasonable. Loomis investigates wages in the Classical period, and after the Peloponnesian War wages (for publicly financed work) seem to settle around 1 drachma until they rise substantially in the period after 330. Obviously there are some who do not produce anything (and perhaps receive a dole from the government, cf. 1b), and some who earn more. We implicitly assume that these groups cancel out.

In all, total labour income in our baseline amounts to $[(30,000 + 20,000 + 5,000) \times 195] + (100,000 \times 300)$ drachmas or 6,787 talents. Note that this method bypasses the problem of estimating income in the informal sector by imputing an income to self-sufficient farmers which is then counted in GDP. This makes Athens more comparable to industrialised current societies than if we had ignored self-sufficient production.¹⁷ We do not impute any income to the other women in Athenian society, presuming that they are engaged in household work which traditionally is not included in the GDP measure.

Then there is return to capital. If you owned more than 3-4 talents you belonged to the group of liturgists, and Hansen (1999), pp. 110ff, suggests that there were at least some 1,200 such persons. We assume that the liturgists on average possess a fortune of 8 talents, for a total of 9,600 talents. Assume further that the rate of return is 8%, which is conventional (Lyttkens, 1992; Ober, 2010). The total income from capital then comes to 758 talents which together with the labour income comprises Athenian baseline GDP. An alternative would be to use the figure which the Athenians arrived at when they assessed the wealth in Attica – 5750 talents in 378, cf. Hansen (1999), p. 113. This is sure to be an underestimation, however, since it is based on self-reporting and the tax system encouraged holding it in “invisible forms,” which included depositing with a bank. For this reason the figure 9,600 talents may also be considerably too low.

Our baseline estimate of GDP is thus $6787 + 758 = 7545$ talents. We use 7,500 in the calculations for the Index. For a lower limit for GDP we assume that there are 100,000 slaves (with again 1/3 doing household work), bringing GDP to $5,716 \approx \underline{5,700 \text{ talents}}$. For the upper limit for GDP, we assume 200,000 slaves, and a GDP at 9,200 talents, *mutatis mutandis*.

¹⁷ An alternative would be to exclude the non-market part of the economy from the GDP estimate. Until recently this would for sure have been taken to suggest that perhaps 80% or more of the Athenians production would be excluded. However, Hansen (2006) shows that the population of ancient Greece could considerably exceed the carrying capacity of the land (the number of people which could be fed). He argues that the best measure of the carrying capacity of Attica is 100,000 persons (p. 90), while the actual population comes to 250,000 plus children in our baseline. This means that grain for more than 2/3 of the population has to be imported and consequently belonged to the market part of the economy. It seems unlikely that other parts of the household's budget is less reliant on the market than basic food. Hence at least 60% of the GDP calculated above belong to the market side of the economy.

As an alternative, Ober (2010) provides estimates of the earnings of different groups in Athenian society (in an analysis of the income distribution). He assumes that the subsistence level (S) corresponds to 100 drachmas per year (as a male income which equals household income), that a relatively comfortable middling status corresponds to $2.4-10 \times S$, and that the rich elite earned in excess of $10 \times S$. If we assume, given the above figures, that the income of the *average* middling family is $5 \times S$ (500 drachmas/year), and that the *average* elite household has an income of $20 \times S$ (2,000 drachmas/year), then the GDP of Athens falls between 5590-6660 talents depending on the assumed proportion of middling vs. subsistence-living ordinary citizens. Note that Ober assumes only 80,000 slaves in Attica. If we use Ober's approach but increase the number of slaves to 150,000, as in our baseline estimate, the GDP falls between 6760-7830 talents, an interval that includes our baseline estimate above.

In the sensitivity analysis we combine the maximum level of government consumption (336 talents) with the lower limit for overall consumption (80% of a GDP of 5,700 talents) and *vice versa*. The upper limit for the share of public consumption is then 8.9% (liturgies included) and the lower limit is 1.9% (liturgies excluded). This is comparable to Myanmar with 4.5 %, giving it a top score of 10 in the Economic Freedom index.

Item 1b: transfers and subsidies

The diobelia are payments of two obols per day to disabled citizens who cannot support themselves which is attested for the late fifth century and seems to have been replaced by a similar support in the fourth century (Hansen, 1999, p. 98; Loomis, 1998, p. 231). If 2% of the citizen population are recipients (600 males) and the support is paid every day of the year, then the yearly expenditure is 12 talents (baseline and upper limit).

The theorika is a payment of two obols per day (Loomis, 1998, pp. 225-226), introduced in the middle of the fourth century, originally as "theatre money" to allow all citizens to afford entry to the theatre on those festival days when tragedies and comedies were performed. It is gradually extended to other festivals. With 30,000 citizens, and assuming everybody receive the payment (one can easily imagine the rich abstaining), it would cost 1.7 talents for each day it was paid. We assume as baseline that it is paid 40 days in a year with a total expenditure of 67 talents.

The theorika could be paid more frequently, effectively exhausting the public budget. In the latter case a reasonable maximum (allowing for some unspecified consumption and investments) seems to be 100 talents. As a minimum for the theorika, given that it is seen as "the glue of democracy" (Hansen, 1999, p. 316) we assume 20 days of payment or 33 talents. The lower limit

for the diobelia that we use is 6 talents (300 recipients). We allow GDP to vary as described above for item 1a. To get a wide range for our sensitivity analysis, we combine high GDP with small subsidies and *vice versa*.

When there is a food crisis the Athenians sometimes use public means to subsidise grain. This however only marginally affects the Athenian score. The reason is that transfers plus subsidies cannot increase substantially beyond the highest figure assumed for the theorika above.¹⁸ A reasonable maximum for transfers and subsidies together is 250 talents (no investments and consumption at a minimum), some 3.3% of baseline GDP. Note however that this entails a reduction in government consumption and hence a higher score on item 1a.¹⁹

Item 1c.: government enterprises and investments

Despite low transfers and public consumption, there is some prominent government involvement in the Athenian economy. The Athenian state owns the silver mines in Attica. They are leased out and the revenue per contract is 200-1500 drachmas per year. In 340, when the mining operations are at their peak, between 420 and 980 leases are in operation at the same time, because there are 140 new leases per year and each lease lasts 3 or 7 years, cf. Isager and Hansen (1975), pp. 42ff and 105ff. For our baseline we assume that half the leases are for 3 years and half for seven years, so that the number of mining operations at any specific time is $210 + 490 = 700$. We also assume that the price for the average lease is 850 drachmas, which brings the total revenue to 99 talents. In the sensitivity analysis we use revenues of 64-142 talents (assuming two thirds short leases and two thirds cheap contracts, and *vice versa*).

We assume that the revenue from leasing other government property is one third of the baseline mining revenue (33 talents). Our baseline estimate for government investments is 50 talents (to correspond with the baseline in 1a).²⁰ GDP varies as in the previous cases.

Finally, we note that there is no personal income taxes in Athens. In all, despite some government interventions, the level of public expenditure and revenue from government

¹⁸ A food crisis is most likely in war, when the possibility to increase these items is even smaller than usual.

¹⁹ In principle government expenditure could have been increased by using previous savings. This occurs repeatedly during the Peloponnesian War – between 431-422, 5600 talents are borrowed from the sacred treasuries, to be compared with a total hoarded wealth on the Acropolis of 6,000 talents just before the beginning of the war (Gabrielsen, 1994, pp. 175-176). This wealth is presumably mostly the result of the tribute coming in from the Empire. In the fourth century, however, the Athenians have to rely to a much greater extent on private means in their wars (op.cit.). Furthermore in the fifth century government surplus is placed with the treasurers of Athena and the Other Gods, cf. Hansen (1999), p. 263. This is no longer normally the case in the middle of the fourth century, when these resources were instead (in peace) normally channeled to the theoric fund, which suggests that they are spent continuously, not hoarded (Demosthenes 59.4).

²⁰ Obviously if government consumption is assumed to increase beyond 350 talents, investments will have to fall. There is a trade-off between the sums in 1a, 1b and 1c.

enterprises is sufficiently low to render very high values for the first dimension of the economic freedom index.

3.2 Legal structure

Property rights are well defined and well protected in Athens, and the legal system is almost free from undue influence of interested parties. The only problem is that many of the inhabitants are owned by other inhabitants (slaves, informally women). This of course lowers the Athenian score.

Note: The latest (2010) version of the economic freedom index adds two sub-dimensions to the second dimension: Legal enforcement of contracts and regulatory restrictions on the sale of real property. For now, we will assume that these are highly correlated with other sub-dimensions.

Item 2a: independence of judiciary

There is essentially no government to be independent of in Athens, it being a direct democracy with decisions taken in the Assembly where all citizens can attend and vote. The first 6,000 to show up receive 3 obols, so almost everybody can actually afford to attend. The public sector is run by magistrates selected by lottery. In theory the lowest property class may still be excluded from some magistracies, but in practice that rule cease to function already in the fifth century.

Decisions on legislation are taken by boards of jurors, where the members are selected by lottery from among a yearly appointed panel of 6,000 citizens, where the members once again are selected by lottery. The rest of the courts are also manned by jurors selected by lot (using a lottery machine), making for example bribery very difficult. Jurors are paid, like assemblymen and members of the Council.

Table 1 cont'd		
2. Legal structure and security of property rights		
2a. Judicial independence	10	Both legislation and law courts are handled by jurors selected by lot. Reference: Sweden currently scores 9.5, but the judicial system was reasonably more independent in ancient Athens.
2b. Impartial courts (i.e., it is possible to challenge government actions)	7.0 [6.0, 9.0]	Reference: Spain scores 8.0 and Malaysia 6.0.
2c. Protection of property rights	0	No protection.
2d. Military interference in the rule of law and the political process	10	No domestic interference (interference only when Athens was under the control of Sparta after the Peloponnesian War). ²¹ Athens have no professional army.
2e. Integrity of legal system	3 [1.0, 4.0]	Reference: South Africa scores 2.9 in 1990.
Athens total score on item 2	6.0	Range [5.4, 6.6] References: Kazakhstan and Jamaica score 6.1, Lettland scores 7.0, Spain scores 7.1

Item 2b: impartial courts

Ever since 594 it is possible to challenge the decision of an archon (the most important magistrate). As noted by Hansen (1999), p. 221, there are established procedures for challenging the activities of the magistrates in general and to bring a complaint to the Council (notably also filled with citizens appointed by lot).

In the second half of the fourth century, as both Burke (1992) and Cohen (1992) note, changes in legislation were undertaken in order to facilitate commercial activity, in particular for foreigners. The procedures for hearing commercial disputes were altered to allow adjudication within a month, and the law was changed to admit to litigation individuals without regard to their nationality.

As regards impartiality in general, the relevant divide is between rich and poor. Judging by the speeches delivered in courts, being rich can be either good or bad. If you are rich, it is expected that you contribute to the common good (liturgies) and pay your taxes. So you may have an advantage against your opponent if you have been generous but you may equally be at a

²¹ An oligarchic coup was planned in 457 (Thukydides 1.107.4-5).

disadvantage if your opponent can show that you have been stingy. Note that the jurors are selected by lot and are ordinary citizens.²²

The only real problem regarding the impartiality of courts is the repeated complaint that the poor in a democracy might exploit the rich in political trials. A trial can lead to heavy fines or outright confiscation of property. The revenue from the courts can make a large contribution to state revenue, but as argued by Ober (1989), pp. 200-202, it is not known to what extent rich persons actually suffer in the courts. In an oration spoken after 338 “there are three examples of how the Athenian courts did *not* fall into the temptation of condemning a number of rich mining-concessionaires. On the other hand, [...] in those very same years, the richest of all [...] Diphilos, was condemned [...] and his fortune of 160 talents distributed among the citizens” (Hansen, 1999, p. 315).

Probably the best interpretation is that this is not a problem in normal times, but in crises situations it could perhaps be somewhat risky being rich if you end up in a court, cf. Hornblower (1983), p. 172 (citing Lysias 30.22). In modern societies the problem is usually the opposite, namely that the rich have an advantage in courts.

Item 2c: intellectual property

In the period we consider, there are no formal laws protecting intellectual property rights. Ancient Greece, however, witness a tremendous change when it comes to recognizing the origin of intellectual accomplishment. For the first time in history, we find artists known by name, and also signing their works with their own name (e.g., some of the artists behind the black-figured ceramic in Athens in the second half of the sixth century B.C.), reputedly we find artists adding their self-portrait to public works of art (Pheidias), authors and play writers are known to us by name, the speeches of famous orators have been preserved under their name etc.

All of this must represent a major leap in intellectual property rights, as perceived by these groups and with respect to providing incentives to engage in such work. If informal rules and social norms are at least to some degree substitute for formal institutions, these improvements may be important. Still, as far as formal institutions go, the score must be 0. We note as a characteristic of the index that it only quantifies formal institutions.

²² The composition of the courts is a contested issue, i.e., whether it is mainly the more affluent citizens who volunteer for these assignments. We follow Hansen (1999), pp. 183ff.

Item 2e: integrity of the legal system

Property rights are in general very well protected. The first action of an archon when he took up office was to swear that “all men shall hold until the end of his office those possessions and powers that they held before his entry into office” (Aristotle, *Athenian Constitution* 56.2). In other words, the importance of protecting property rights is established yearly by the highest ranked official.

Slaves do not have exclusive rights to their own body (and no political rights). However their legal personality at least begin to be defined in the fourth century. They are now allowed to give evidence like free men. They can enter into contracts on their own behalf and be personally prosecuted.²³ Freedmen (manumitted slaves) are included with the resident foreigners (metics). They cannot own landed property.

This seems also to be the most appropriate place to consider the restricted judicial and political rights of women. Women cannot appear in court, and are for many purposes treated as the property of their husbands.. They can however divorce their husbands whenever they want, with the restriction that they need a male relative to act on their behalf. In case of divorce, the woman takes her dowry with her (i.e., it is always her own property). Women have no political rights.

How much weight the restricted position of women and slaves should be given in this particular context is not altogether obvious. Perhaps South Africa is illuminating – it scores 2.9 in 1990 which increase to 6.1 in 1995. Contrary to the South African racial regime, slaves in Athens can rise socially and in their rights – they can be manumitted and their children can become citizens (in special cases this privilege is conferred also upon first generation freedmen).²⁴

Item 2: total score

The Athenian score on item 2 is a field open for suggestions. In a modern perspective, Athens score very high on items 2a, 2b and 2d, and very low on 2c. The main downside is the treatment of women and being a slave society. However as we understand the index, these disadvantages can only appear under item 2e and therefore have a limited influence on the total score.

²³ Austin and Vidal-Naquet (1977), p. 147.

²⁴ The prime example is the banker Pasion.

3.3 Sound money

In general it is completely clear that the Athenians have access to what is at the time regarded as extremely sound money (Engen, 2005). Athenian coinage – the famous “owls,” tetra drachms in silver – are the greenbacks of the eastern Mediterranean. Athenian coins are found over large distances, and sometimes the Athenian coins are imitated by other states – not necessarily with fraud in mind. The imitations often contain the same amount of silver as the originals. In 375/4 a law is enacted that charge an official with the task of taking out of circulation debased Athenian looking coins. Traders are ensured that Athenian coins obtained in Athens are of certified value thus encouraging trade. The Athenians choose to retain a comparatively less aesthetically pleasing and archaic coin in order to build upon its reputation. The Athenians are aware of the beneficial effect of trade on their prosperity (Xenophon, *Ways and means* 3).

Whether the relative price of silver changes during this period is another matter. This would correspond to a change in the value of money. Silver mining expand in Attica from c. 355, but most of this silver is exported (Isager and Hansen, 1975), and for the relative price of silver the whole trading regions is what matters, which means that variations in Athenian mining have a limited impact. Note that Alexander has not yet conquered and released the Persian treasury. With a doubling of the real wage over the fourth century, as indicated by Scheidel (2010b), inflation might well have been nil if money supply also doubled.

3.4 Freedom to trade

The Athenians tax imports and exports at 2%. Despite being modest by today’s standards, revenue from this tax is an important part of public revenue (Athens have considerable transit trade). Trade is unregulated, with the notable exception of trade in grain (cf. below).

Table 1 cont'd		
3. Access to sound money		
3a. Growth of money supply less growth in GDP	9.4	Note that Athenian money was silver coinage. It seems unlikely that growth of money supply and growth of GDP differed more than 3%. Reference: Greece (today) with money growth at 3.4% is given 9.3, Japan with 2.7% growth is given 9.5.
3b. Variation in the inflation rate	9.4?	Cannot have been significant, given the stability of the silver coinage (cf. below). We suggest the standard deviation would not have exceeded 2. References: South Korea with a standard deviation of 1.66 scores 9.3. Romania with 1.9 scores 9.2. Greece today with 0,2 scores 9.9.
3c. Recent inflation rate	9.4	Unlikely to have exceeded 3%. References: Ireland with a recent rate of 3,9% scores 9.2 in the index. France with 2.8% scores 9.4.
3d. Freedom to own foreign currency	10	No restrictions
Athens score on item 3	9.6	

Item 4bi: hidden trade barriers

Since the Athenians starve without the import of grain, several regulations apply. One law forbade anyone living in Athens or Attica (whether citizen or metic) to lend money to a ship importing grain into any other place than Athens. Another law forbade anyone living in Athens or Attica to transport grain to any other harbour than Peiraeus and two thirds of the grain had to be disposed of in Athens. The grain trade was the only one regulated in this way. Cf. also below item 5ci. A modern day counterpart to this regulation is the export ban on rice introduced in India in 2008, which was noted in the index as a decrease in non-tariff trade barriers by 0.4 (from 6,1 to 5,7), decreasing the total score for regulatory trade barriers by 0,2. In other words: the trade restrictions on grain seem prominent because trade is otherwise free in Athens. The effect of the regulation on the economic freedom score for freedom to trade is marginal (around 0.1).

Table 1 cont'd		
4. Freedom to trade internationally		
4a. Taxes on international trade	9.4	
4ai. Revenue from taxes on trade as a percentage of exports plus imports	8.7	2%. Both exports and imports were taxed at the rate 2%. Reference: South Africa with 2.14% scores 8.64.
4aii. Mean tariff rate	9.6	2%. Reference: Georgia with 1.4% scores 9.7.
4aiii. Standard deviation of tariff rates	10	0.
4b. Regulatory trade barriers	9.6	
4bi. Hidden barriers or only published tariffs and quotas.	9.2 [8.8, 9.6]	No hidden barriers, but regulation of the grain trade. Reference: The score for India is reduced by 0.4 when they ban rice exports.
4bii. Combined effects of tariffs, fees, administration etc raises costs of importing by more than 10%?	10	No.
4c. Actual size of trade sector compared with expected size	9.0 [8.5, 9.5]	Arguably considerably larger than expected. References: Hong Kong scores 10, Hungary scores 9.
4d. Difference between official and black market exchange rate	10	No difference (no official exchange rate).
4e International capital market controls	10	
4ei. Citizens' access to foreign capital markets and vice versa	10	No restriction
4eii Capital market exchange with foreigners	10	No restriction
Athens total score on item 4	9.6	Range [9.5, 9.7]

Item 4c: size of trade sector

For the modern economies, the score on this item is based on a regression model that estimates the expected size of the trade sector given the size and location of the country. If a nation trades a lot more than the model predicts, then it is concluded that the policy regime must be favourable to trade and vice versa (Skipton and Lawson, 2004). Without any ambition to enter Athens into such an exercise we nevertheless suggest that the Athenians relied on trade to a considerably greater extent than expected, given its size, location, and time period.²⁵

3.5. Regulation of credit, labour and business

Not surprising perhaps for a state of this period in history, these different sectors were in principle not regulated. The fact that distinguishes Athens is that, for example, the banking sector exists at all, which is arguably a function of the relative security of property rights, the relatively modest tax rates etc.

Item 5ai: deposits in private banks

Temples serve as banks in the capacity to safeguard property entrusted to them. To earn some interest on your deposit, you have however to place your wealth with a bank. Sometimes the temples are tempted to place the deposits left with them in a bank to earn a return. A famous scandal ensues when a bank could not pay back the capital and the temple officials try to destroy the evidence (that the property was no longer in the temple) by arson. We treat the temples as non-banks, since they are economically equivalent to putting the money in the mattress. There are no non-private banks. In a sense, the banks are *very* private since the Greeks do not make any difference between the banker as a person and his banking business. Depositing money with a bank is described as leaving it with Mr X, cf. Cohen (1992)

Item 5aii: competition from foreign banks

²⁵ It can be argued that the Athenians enjoy a beneficial location that attracts transit trade, but so have several of their competitors, Corinth, Aegina, Rhodes, to name a few.

Banks are typically not owned by citizens. Instead they are owned by metics (often freedmen), resident in Athens, but also by some individuals identified by their country of origin, cf. Cohen (1992), p. 174, and Hansen (1999), p. 119. So the answer arguably is “yes”.

Table 1 cont'd		
5. Regulation of credit, labour and business		
5a. Credit market regulations	10	
5ai. Percentage of deposits in privately owned banks	10	100%?
5aii. Competition from foreign banks	10	Yes.
5aiii. Percentage of credit extended to private sector	10	100%
5aiv. Interest rate controls	10	No controls.
5b. Labour market regulations	8.2	
5bi. Impact of minimum wage on wages	10	No minimum wage
5bii. Hiring and firing practices	10	No regulation.
5biii. Collective bargaining	10	No collective bargaining
5biv. Unemployment benefit preserves incentive to work	8?	Yes probably.
5bv. Use of conscripts to obtain military personnel	3	Eventually two years' compulsory training and service. Otherwise service is subject to a social norm. Reference: Sweden scores 3.
5c. Business regulations	9.1	
5ci. Price controls	8?	Mainly indirect and imprecise regulation of grain prices. Reference: Denmark scores 8.
5cii. Administrative obstacles for new businesses	10	No restrictions
5ciii. Time spent dealing with government bureaucracy	9.5	A small amount of time is spent dealing with magistrates appointed to control the dealings in the agora (market place), such as the proper use of weights and measures.
5civ. Starting a new business is easy	10	No restrictions
5cv-cvii. Various obstacles	8?	Foreigners are not allowed to own real estate.
Athens total score on item 5	9.1	

Item 5aiii: credit to private sector

We assume that this question covers only credits extended by banks – not by the temples which ran on a more non-commercial basis.

Item 5biv: social benefits and incentives to work

Citizens without any means to support themselves receive 2 obols (it is unclear whether they have to be disabled.) The daily wage is probably 1 drachma (cf. item 1a). Ober (2010) argues that the sustainable minimum for an adult male (with a family to support) probably is 3-3.5 obols.

Item 5bv: military conscripts

Two years of military training and service (ephebic service) is compulsory at least by 336/5 and this practice may have originated early in the fourth century (Hansen, 1999, p. 109). However the Athenians often need the service of many more men than these two age cohorts can provide. It is expected of a citizen that he is willing to take part in military actions, whether as foot soldier, sailor, etc. In other words, participation is enforced by a social norm. However, the fact that sailors and soldiers are paid both in the fifth and in the fourth centuries, and that payment continues even in periods of crises (Loomis, 2010) suggests strongly that there is also an element of voluntariness in military service. In the fourth century, furthermore, Gabrielsen (1994) shows that trierarchs often pay others to do the actual captaining of a ship. The fourth century also witness the (renewed) use of mercenaries, now also in the wars between the *poleis* (Hornblower, 1983), which may imply that military service is not compulsory. Gabrielsen (1994) notes that conscription is only used exceptionally. We suggest that Athens scores somewhere around Sweden (in Sweden military training nowadays is in practice voluntary, but military (domestic) service is compulsory once you have trained).

Item 5ci: administrative obstacles for new businesses

Magistrates controll that “unground corn in the market is on sale at a fair price, and next that millers sell barley-meal at a price corresponding with that of barely, and bakers loaves at a price corresponding with that of wheat” (Aristotle, Athenian Constitution 51.3). Also, grain retailers are not allowed to buy more than a certain quantity of grain at a time, to prevent speculation.

Sometimes individuals are lauded for selling at not much above usual price despite there being a shortage (Hansen, 1999, p. 98). This suggests that such benefaction was an unusual practice and a possibility. In other words, the price regulation is not very strict. It also implies that subsidies are not always available or adequate.

4. And the total score for ancient Athens is²⁶...

8.9!

This is close to Singapore's 8.75 and close to Hong Kong's 9.02, the two top countries in the Index in 2008. The range for the Athenian total score is [8.66, 9.00].

5. Discussion

Classical Athens is famous for its achievements in many areas: art, literature, rhetoric, philosophy, to name a few. The intellectual accomplishments have few parallels in history. They are grounded in historically exceptional material well-being. Such conditions almost necessarily presuppose a well-functioning economy. We have shown that in terms of economic freedom, Athens lies at the very top compared to modern economies. The total score for fourth century Athens in the Index is 8.9, which it is close to Singapore's 8.75. In other words, it lies not between Burkina Faso (5.94) and Brazil (6.18), but is instead better than both Belgium and Britain (to complete the set of alliterations).

If we consistently use the most unfavourable figures in each sensitivity analysis, the total Index score for Athens becomes 8.66, which still puts it in third place worldwide, and if we instead use the most favourable figures, the total Index score becomes better than that of Hong Kong, which is currently in the top, and it does so even when compared to the all-time high of Hong Kong in 1980.

We obviously cannot claim to have shown that the economic freedom we demonstrate is the factor that leads to the – for its time – considerable prosperity of ancient Athens. Tentatively we suggest however that we may have uncovered one of the mechanisms through which democracy affect the material and cultural success of Athens (as described by Ober (2008; 2010). It is worth

²⁶ Unfortunately the answer 42 (cf. Smith, 2007) is ruled out by the construction of the index, so we are probably wrong by definition.

pointing out that the Athenians are perfectly capable of constructing complex administrative procedures and to regulate behaviour in various ways. Consequently the high degree of economic freedom should not automatically be explained by the absence of regulations earlier in history. On the contrary, we strongly suspect that the Athenians would have invented such regulations, had they seen it as beneficial. The Athenians are aware of the importance of specialisation and trade for their own prosperity.²⁷

When we speak of the Athenian success, it should be understood mainly in relative terms, i.e., as compared to its competitors in the inter-polis struggle. The lack of citizen rights for slaves, women and those not borne of Athenian parents are common features of the time. It also happens to play a minor role in the Economic Freedom Index. In a more comprehensive evaluation of ancient Greek society, this would obviously have to be considered. Similarly, Scheidel (2010a) notes that when ancient Athens is compared to other historical societies, the Athenians score high on social welfare as long as we restrict our analysis to free adult male citizens, but less so if we include other groups in society.

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²⁷ Xenophon *Ways and means* 3-4. One important aspect of the increase in trade is of course the influx of labour in the form of slaves, which may be an important factor in the prosperity of ancient Greece and the Athenians. A modern day counterpart could be the migration of Mexican workers to the US.

Appendix: A tentative overview of public revenues and expenditures in Athens around 340-350 B.C. (all figures in talents, partly rounded off) *

REVENUE		EXPENDITURE		CATEGORY
Regular		Regular		
Harbour tax	108	Assembly meetings	45	Consumption (C)
Metoikion	45	Assembly expenditure	10	C
Pornikon	15**	Law courts	23-37	C
Leasing of silver mines	99	Diobelia	12	Transfer (T)
Leasing of other public property	33**	Theorika	67	T
Fines and confiscations	20**	Fodder to horses for the cavalry	40	C
<i>Eisphora</i>	10	Ephebes training	25	C
Unspecified revenues	70**	Other military expenditures	46**	C
		Unspecified consumption	70**	C
		Investments	50**	Investments
Total revenue	400	Total expenditure	400	
Informal				
Festival liturgies	25			
Trierarchies	50			
Occasional		Occasional		
<i>Eisphora</i>	60-120	Warfare	Huge	C
		Subsidized grain		Subsidies
Sources: Hansen (1999), Isager & Hansen (1975), own calculations, pure guesswork (denoted **)				

* Note: This should not be seen as a budget. The Athenians allocated certain sources of revenue to certain purposes. The revenue from the harbor tax was slightly above 36 talents just after the Peloponnesian War (Andokides 1.133-134). We assume in this Table that it was triple that amount in the middle of the fourth century (if it is true that public revenue was 1200 talents after 338 B.C., a considerable amount of this increase is probably due to the harbor tax). The head tax for resident foreigners (the *metoikion*) was 12 drachmas per year for males and 6 drachmas for independent females. Nothing is known about the rate at which prostitutes were taxed.

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