



The political economy of Solon's law against neutrality in civil wars

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Abstract

In 594 BCE, the Athenian lawgiver Solon, called upon to resolve a deepening social crisis, introduced a new constitution and mandated that in civil conflicts, no citizen is to remain apathetic and must take sides. Because the law seemed to support strife, it presents a puzzle. The paper offers a political economy rationale for Solon's law against neutrality, modeling social conflict as a rent-seeking competition. We divide society into three groups, a hereditary aristocracy, which monopolized power before the Solonian constitution, a rival wealth-based commercial elite, called the new Solonian elite, and the poor, who are enfranchised only partly. We then identify the conditions under which the third group is better off by allying with one of the other groups, protecting the Solonian constitution. In our framework, Solon's ban on neutrality is an attempt to change the payoffs from violent redistributions of rents, so that conflict is avoided. Accordingly, the ban should not only impede excessive rent seeking, but also prevent the exclusion of any social group.

Keywords Ancient Athens · Solon · Political non-neutrality · Rent seeking · Intra-elite competition · Political apathy · Civil war · Inclusive institutions

JEL Classification D72 · D74 · N4

1 Introduction

In 594 BCE, after a period of internal conflict between the aristocratic elite and the common people of the city-state of Athens, the lawgiver Solon introduced a new constitutional and political dispensation granting some political, economic and civil rights to previously disenfranchised Athenians. One of Solon's laws made it compulsory that in the event of a

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civil conflict (*stasis*), every citizen must take sides. Aristotle’s Athenian Constitution, 8.5, (1984, pp. 49–50), describes that obligation as follows:

Seeing that the city was often in a state of strife, and that some of the citizens through apathy accepted whatever might happen, he [Solon] enacted a special law to deal with them, that if the city was torn by strife anyone should refuse to place his arms at the disposal of either side should be outlawed and have no share in the city.

This is one of the earliest examples of the dictum “you’re either with us, or against us” pronounced in polarized circumstances to force non-participants to abandon neutrality, or apathy. What was Solon’s rationale for compelling citizens to take sides? Mandating citizens to do so in a situation of conflict expands the numbers of potential opponents, thereby increasing the risks of and the losses from violence. Calling citizens to participate in the conflict alludes to a deliberate suspension of the notion of the state as the agent with a legitimate monopoly use of power. Staying neutral and abstaining from taking sides would have been thought of as a sensible response in a situation of heightened risk to individuals’ lives and property. Why did a “sage” like Solon (one of the so-called “seven wise men” of ancient Greece) mandate non-neutrality? The present paper offers a rational choice answer to that question.

The following section sketches the historical background of the law and surveys the modern debate about the law and how it relates to modern political economy research. Section 3 builds a model of conflict between the rich and the middle-income class wherein the former seeks to overthrow the ‘Solonian order’ and establish a ‘tyranny’ that repeals the rights of the middle-income earners, while a third class, the poor, may join or stay out of the conflict. Section 4 discusses the intuition offered by the model. Section 5 concludes.

2 Historical background and review of scholarship

2.1 Solon’s reforms

The first historical information we have about ancient Athens relates to events in the final third of the seventh century BCE when Athens was governed by a birth aristocracy of rich landowners. In 622, Draco compiled a written code of harsh laws that seemed to have confirmed the hold of the landed aristocracy on power.¹ The prevailing constitutional order excluded from power individuals who over time had become wealthy but were not members of the traditional aristocracy. In 594, with continued conflict between the aristocracy and the common people, Solon, a man “of high birth, but of middling wealth and station” (Andrewes, 1982, p. 377) and a poet, was called and accepted by both sides to resolve the crisis.² Solon confronted a breakdown of the social order and must have worried about the opportunities that such anarchy offered to ambitious rich individuals to impose their will as ‘tyrants’³ on an apathetic public and the consequent instability.

¹ Of those only the harsh law (henceforth, the term ‘draconian’) on unpremeditated homicide survives.

² Appointment of a ‘wise man’ as a lawgiver, or arbitrator, during periods of civil strife with the mandate to institute political reforms was a practice common in the archaic Greek city-states of the seventh and sixth century, see Wallace (2007) for details.

³ A tyrant was a ruler who had taken control of the government through extra-constitutional means, like a coup, rather than an oppressor.

To resolve the crisis, Solon introduced significant constitutional, political and economic reforms aiming to ameliorate the economic hardship that had hit poorer sections of the population and offered them a partial say in the government of Athens. He reorganized the governance of Athens, granted standing rights to previously disenfranchised Athenians, allowing them to appeal against the decisions of magistrates, and empowered any third uninjured party to take legal action on behalf of an injured person for a crime. The constitutional and political reforms founded a new political dispensation, replacing government by a birth aristocracy with a *timocracy*, that is, one based on wealth, by adding “the wealthy to the well-born in the running of the state” (Hansen, 1999, p. 44).⁴ Solon divided the Athenians into four classes according to annual agricultural output (although questions remain about the exact meaning of sizes and comparability of different products). Those with 500 or more measures of grain or olive oil, called *pentacosiomedimnoi*; those with 300–500 measures, called *hippeis*, rich enough to maintain a horse; those with 200–300 measures, called *zeugitai*, rich enough to afford a pair of oxen; and those with less than 200 measures, called *thetes*, mainly landless laborers. Political offices were then allocated according to economic rank with the highest offices reserved for the two richest classes and the fourth altogether excluded. All classes however, that is, the lowest included, were free to attend the assembly of the demos. By extending eligibility for political office to non-aristocrats of higher and lower means, the traditional landed aristocracy could no longer monopolize political power.

Solon’s economic reforms included *seisachtheia*, the “shaking of burden” of poor Athenian farmers indebted to the rich into what was effectively a form of serfdom and turned them to small landholders.⁵ His reforms also made economic idleness a crime and mandated that fathers had to teach their sons a trade.⁶ By granting all Athenians the right to participate in the assembly and establishing the right to appeal against the decisions of the government (*archontes*) in front of the court, Solon set in motion a sequence culminating in the establishment of democracy after the reforms of Cleisthenes in 508/7.

Ancient authors did not doubt the existence of the law against neutrality but, with Solon lamenting stasis and recommending restraint in his poetry, they found it rather baffling. Writing about Solon in the first century CE, Plutarch (Lives, Solon, XX, 1967, p. 457) reiterates the existence of the law and offers a normative justification for it:

Among his other laws there is a very peculiar and surprising one which ordains that he shall be disfranchised who, in time of faction, takes neither side. He wishes, prob-

⁴ For extensive descriptions and critical discussions of the reforms of Solon see amongst others Hansen (1999, pp. 29–32 and pp. 43–46), Wallace (2007), Lyttkens (2013, pp. 54–57 and pp. 72–79), Ober (2015, pp. 148–152) and Patriquin (2015, pp. 11–16).

⁵ Interpreting the surviving sources from the sixth and later centuries is fraught with difficulties. Andrewes (1982) offers a detailed survey of the problems. Briefly, the *hektemoroi* who were poor farmers working their own land were obliged to pay one-sixth of their production to the rich landowners; those who failed to pay could be sold to slavery, and so could all those defaulting on debts. Solon abolished enslavement for debt, allowed the *hektemoroi* to hold their land free of obligations, and freed those who had been enslaved. After Solon’s reforms, the extant sources no longer refer to *hektemoroi* which implies that the strife caused by debt enslavement had been resolved for good.

⁶ “Observing that the city was filled with men who were constantly streaming into Attica from all quarters for greater security of living, and that most of the country was unfruitful and worthless, and that seafaring men are not wont to import goods for those who have nothing to give them in exchange, he turned the attention of the citizens to the arts of manufacture and enacted a law that no son who had not been taught a trade should be compelled to support his father.” (Plutarch. Lives, Solon, XXII, 1967, p. 465).

ably, that a man should not be insensible or indifferent to the common weal, arranging his private affairs securely and glorying in the fact that he has no share in the distempers and distresses of his country, but should rather espouse promptly the better and more righteous cause, share its perils and give it his aid, instead of waiting in safety to see which cause prevails.

Yet, some residual doubts may remain about the existence of such a law. The main source, *The Athenian Constitution*, was written more than two hundred years after the events, while Plutarch (46–119 CE) was separated by 600 years from Solon’s era and wrote biographies of famous statesmen rather history. Nevertheless, one may be confident in the allegiance of the Athenians to the spirit of the law: In the ‘Funeral Oration’ by word of Pericles in 431, Thucydides (II.40.2, 2009, p.92) declares.

... our politicians can combine management of their domestic affairs with state business, and others who have their own work to attend to can nevertheless acquire a good knowledge of politics. We are unique in the way we regard anyone who takes no part in public affairs: we do not call that a quiet life, we call it a useless life.⁷

2.2 The puzzle of the law against political apathy

Starting with the English historian Grote in the mid-nineteenth century, several scholars saw the law as aiming to defend Solon’s constitution and deter potential tyrants. However, modern historians have debated the existence of such a law and mulled over its exact meaning (see Goušchin, 2016 for a recent survey).

Hignett (1967, pp. 26–27) rejected the existence of the law on neutrality, arguing that it was a priori improbable, inconsistent with Solon’s views in favor of moderation, and it was not explicitly referred to by the orator Lysias in the “*Against Philon*” (speech 31), a forensic speech seeking to convict Philon for not taking sides during the civil war of 403 when the democrats overthrew the rule of the Thirty Tyrants.

But such arguments were discarded by Goldstein (1972), who concluded that Solon’s law was not applicable in the circumstance of 403.⁸ Bers (1975) considers the law as authentic, arguing that Solon’s motivation was to force his supporters to actively back his constitutional dispensation. This of course begs the question of why the law prohibited apathy instead of mandating that Athenians must support the new Solonian constitutional order, an issue noted by scholars and explicitly addressed by our formal model. In the wording of Solon’s law, an Athenian who shies away from taking sides is declared *atimos* translated as an ‘outlaw’. For Manville (1980), the law against neutrality fitted the historical setting of Solon’s reforms, since “... with new public rights came new public obligations. Those who failed to support the revolution would lose their share in it and consequently, for the first time, *atimia* entailed loss of a share in the polis. The *atimos* was now a different kind of outlaw: one with no claim to the citizenship which implied rights in the

⁷ It bears noting that an ordinary citizen pursuing private interests only (*idion*) is known as *idiōtēs* which etymologically through Latin is the root of the English word idiot.

⁸ Philon was located away from the place of fighting against the Thirty Tyrants, while a recent amnesty had made difficult to accuse men of violating laws dating back before the end of the civil war against the Thirty Tyrants. Further, Bers (1975) pointed out that reference to the non-neutrality law in the Philon speech might have raised fears for prosecutions of other Athenians who were inactive during the civil war leading to cycles of retaliation and instability.

assembly and protection of suit and appeal” (pp. 218–219).⁹ For Wallace (2007), the law against neutrality is consistent with the rationale of the reforms initiated by Solon where “every citizen, rich or poor, was expected to involve himself in public affairs ... not least in times of civic strife ... or be expelled from the civic body” (p. 61).

Van’t Wout (2010) focuses on the language of the law as given in Aristotle’s *Athenian Constitution* and argues that Solon’s law on *stasis* “should be read as one that requires citizens to play an active role in the resolution of a conflict” (p. 290). Teegarden (2014) discusses several arguments against the authenticity of the law, including that it was contrary to Solon’s revulsion of *stasis* and the problem of how to enforce it. He rejects these arguments reasoning that the law would deter a coup attempt and thence prevent *stasis*. He also accepts that Solon wanted all Athenians to be actively involved in the life of their polis and difficulties of enforcement do not deny its authenticity. Nevertheless, Teegarden rejects the authenticity of the law on different grounds. If one believes that the purpose of the law was that whatever type of regime ruled Athens it must enjoy majority support, the law would have allowed the overthrow of the very constitutional order introduced by Solon. However, he argues that Solon could not have consented to the unravelling of his constitution; henceforth, Solon would not have passed a law against neutrality. Noting that there already was a law against tyranny, and, in particular, a law against tyranny enacted by Solon, one wonders why the law against neutrality was necessary. Goušchin (2016) answers this question by arguing that the law against neutrality was genuine and that it aimed to “close the path to tyranny by awakening the citizens’ activism and consequently preventing *stasis*” (p. 107).

An additional indirect indication favoring Solon’s authorship of the law against neutrality is its consistency with the general thrust of the Solonian legislation granting “permission for anyone who wished to seek retribution for those who were wronged” (*Athenian Constitution*, 9.1, Aristotle, 1984, p.50). This amounted to an extension of “the right to start a prosecution by a third party on behalf of an injured person or simply in the public interest” (Hansen, 1999, p. 30); as such it alluded to a call for conflict, a principle that corroborates the law against neutrality.

Forsdyke (2005) observes that in addition to the elite versus non-elite conflict present in Athens before Solon, violent intra-elite competition for control of Athens was a fundamental problem. Intra-elite conflicts were characterized by violent clashes ending with the exile of the defeated side, only for the latter to regroup and return to the polis seeking revenge and exile the former victors in a repeated cycle of instability. Forsdyke maintains that an essential part of Solon’s reform program was to resolve this intra-elite conflict and argues that it was for this reason that Solon initiated the law on civil strife.¹⁰ “By requiring non-elites to take sides in a situation of political conflict between elites, Solon hoped to prevent the violent and rapid transfer of power from one elite faction to another. In particular, elites

⁹ Manville (1980) examines the co-evolution of the notions of citizenship and *atimia* and corresponding penalties from the archaic time of Draco to fifth century Classical Athens. Hansen (1999) has shown that during the Classical Period (510–322) the punishment for an *atimos* was the loss of various privileges enjoyed by citizens; they included withdrawal of the right to introduce decrees, participate in the assembly, serve as a juror, bring public or private suits, give evidence in court, become a magistrate, and enter sanctuaries or the agora.

¹⁰ Another most important law introduced by Solon was the selection of archons (magistrates governing Athens) by lot among candidates elected by the four “tribes” which traditionally composed the Athenian population (*Athenian Constitution* 8.1). See Tridimas (2012) and the literature therein for a rational choice analysis of selection of public officeholders by lot.

would be deterred from seeking power violently, since they would now have to face the opposition of the entire citizen body and not just a narrow group of rival elites” (ibid. p. 99).

An additional perspective is also relevant to the law. Larsen (1949) argued that majority voting emerged in the Seventh century to prevent civil war, as a result of the new military technology of hoplite (heavy infantry) fighting where the number of spears amassed by each side turned out to be decisive. By banning neutrality, Solon acknowledges at least implicitly the potency of majority voting as a way to resolve civil conflict peacefully. That is, to be decisive citizens with newly granted political rights must engage in public affairs.¹¹

The law ultimately failed to protect the Solonian constitution. The Athenians split into three competing sides, the Men of the Plain (around Athens), the men of the Coast, and the Men beyond the Mountains. Peisistratus, the leader of the latter, after two unsuccessful attempts in 561 and 555, eventually established himself as tyrant in 546 remaining in power until his death in 527. He was succeeded by his sons, Hippias and Hipparchus, but after the assassination of the latter (for personal rather than political reasons) Hippias became an oppressive ruler. He was overthrown in 510. A conflict between rival aristocrats followed, pitting Isagoras, who asked Sparta to help him to establish oligarchy, against Cleisthenes, who allied himself with the demos. In 508, Cleisthenes prevailed, and his constitutional reforms founded the Classical Athenian democracy.

In the present paper, we follow the commonly accepted interpretation that Solon’s law was a law against neutrality. In closing this review, two observations are worth making. First, enforcing the law against neutrality may sound problematic (although it bears noting that problems of enforcement do not necessarily negate the existence of the law). However, since the law did not mandate to defend a particular regime, enforcement in the sense of punishment had to be retrospective. That is, whoever emerged victorious from the stasis would administer the relevant sanction to those who had fallen foul of the law. Second, from a modern standpoint, an important consequence of the law is that it forces citizens to participate in political disputes. This way, citizens are more likely to take an active interest in what exactly is involved in the dispute; therefore it punishes rational ignorance.

2.3 Relation to modern political economy literature

Solon’s law against political apathy grapples with the ever-present question of how to motivate citizens to engage in politics so that interest groups do not capture the state. In this light, the paper relates to three partially overlapping strands of political economy literature, the rational voter participation in politics, cohesive institutions, and inclusive institutions.

Following the intuition of the rational voter ignorance (Downs, 1957; Tullock, 2005), apathy is “rational” for non-elite citizens since the expected gains from participating in social conflict are insignificant while the risks are large.¹² It follows that the prospect of public goods provision may not motivate mass mobilization to overthrow a dictator or,

¹¹ We owe this intuition to an anonymous Referee. In this connection, Pitsoulis (2011) offers a synthetic view of the co-evolution of majority rule with military technology precipitating greater participation of larger number of citizens in war, the emergence of egalitarian principles, and economic development in Ancient Greece.

¹² Caplan (2007) goes further arguing that voters are worse than ignorant, they are irrational. Whitman (1995) argues that limited information by some voters can already be sufficient to secure efficient political competition.

contrarily, to support an existing institution. Tullock (*ibid.* pp. 261–291) demonstrates that ordinary citizens will stay neutral in a fight between the government and a revolutionary side unless they expect significant rewards or sanctions from the winner of the fight. Further, neutrality may be costlier than taking sides if the winner of the conflict is likely to feel that those who did not support him during the fight cannot be trusted. Therefore picking the right side is very important. This issue plays much in our theoretical investigation.

Limited political awareness and apathy may result from individuals responding emotionally to institutional practices, elite manipulation and the established social and cultural context (DeLuca, 1995). Congleton (2001, 2007) notes that rational ignorance generates biased expectations, while it also incentivizes candidates for political office to attend to the policy preferences of relatively well-informed voters and, thus, adopt policies advancing their interests.¹³ Thence, a reduction in rational ignorance should improve the efficiency of the government.

Cohesive institutions ensure that the interests of actors out of political power (like opposition parties) are not dismissed so that the distribution of rents is more inclusive and the risk of political violence is lower (Besley & Mueller, 2018; Besley & Persson, 2011). Fetzer and Kyburz (2021) report evidence that cohesive institutions can prevent violent redistribution. However, building cohesive institutions by force is rather unpromising (Besley & Mueller, 2021). The same seems to be true for compulsory voting, which may be efficient in theory (Krasa & Polborn, 2009), but has only ambiguous empirical support. Voter turnout indeed tends to be higher (Singh, 2015) but reluctant voters seemingly cast invalid votes (Kouba & Lysek, 2019), and are less willing to acquire political information (Singh & Roy, 2018).

Inclusive institutions, distributing economic and political power broadly, in combination with state capacity, promote economic prosperity (Acemoğlu & Robinson, 2012). Acemoğlu and Robinson (2016) refer to Solon's reforms as making Athenian politics pluralistic and founding inclusive institutions. Acemoğlu et al., (2001, 2002) present evidence that European colonies, which had more inclusive institutions in the past, also tend to be more inclusive today and also have higher incomes per capita. Tabellini (2010) finds similar effects for European regions. The meta-analysis of Doucouliagos and Ulubaşoğlu (2008) shows that democracy may not have a direct effect on economic growth but has a significant indirect effect via its positive impact on inclusive economic institutions.

3 A formal model of Solon's ban on neutrality

We model the Athenian conflicts at the time of Solon as an intra-societal struggle for the distribution of rents between two elite groups. Although at the time there was no remuneration for public office, archons (those with the authority to rule) had the right to decide policy as well as enjoying social prestige, while the Solonian constitution also offered equal access to justice by all citizens irrespective of wealth, and, most significantly for the poor, elimination of the risk of indenture servitude. The competition turns violent when one side initiates stasis and mounts a coup. Solon's ban on neutrality is an attempt to change the payoffs from fighting so that violence is avoided. To succeed, the ban should not only

¹³ Glaeser and Ponzetto (2014) study a model of politicians privileging public-sector workers with generous pension plans when the later are better informed than their private-sector counterparts. Bagchi (2019) presents evidence that pension plans for public-sector workers are more generous (and often underfunded) when voters are less informed about politics.

impede excessive rent seeking but also prevent the exclusion of any social group. The Solonian constitutional order aims to ensure the cohesiveness of its institutions by shifting larger shares of rents from the aristocratic elite to other social groups, but at a rate that does not incentivize the aristocracy to attack the Solonian dispensation, and simultaneously by preventing inter-elite collusion at the costs of the common people.

To explore the impact of the ban on neutrality, Sect. 3.1 explores a baseline model of the Solonian constitution and analyzes two settings: (i) a society without a ban on neutrality but where all citizens are obliged to defend the Solonian constitutional order, the status quo of our model; and (ii) a society with a ban on neutrality, where all citizens are obliged to defend the Solonian status quo. Within this setup, we show how a ban affects the incentives of the different social groups and, thus, the distribution of rents. Analyzing only the ban on neutrality, however, falls short of understanding its full impact. As already said, a mystifying aspect of the ban is the apparent lack of an obligation to defend the Solonian order. The latter allows the Athenians to join any social group in a conflict, jeopardizing the Solonian order. To illustrate its effect, the model then assumes the counterfactual of an obligation to defend the Solonian constitution. It turns out that Solon's law, banning neutrality but allowing all citizens to fight for any group, has some advantages over one that forces them to take the side of the Solonian order because the law increases the cohesiveness of the constitutional order. This could explain why it was enacted without an obligation to defend the status quo. Our formal treatment echoes Tullock (2005, p. 168) that “a government, or a revolutionary party, in attempting to attract support, should try to maximize the payoff of entry into the revolution on their side. This can be done either by offering positive rewards for contributions or by imposing penalties for not contributing.”

3.1 Baseline model of the Solonian status quo

We assume a society consisting of three Players indexed by $i = A, S, P$, with exogenous incomes Y_i , where $Y_A = \theta_A Y$, $Y_S = \theta_S Y$, and $Y_P = \theta_P Y$, and $\theta_A > \theta_S > \theta_P = 1$. Players A and S are two (unequally affluent) rival elite players, both able to dominate the polis' politics. Stylistically, A includes the highest class of members with 500 measures of output; these are primarily the traditional landed aristocracy, hostile to the affluent non-aristocrats and the previously disenfranchised. S includes wealthy non-aristocrats who were excluded from political office before the reforms; these are mainly the second income class but may also include wealthy non-aristocrats. Player P is the common people, who are not necessarily poor but do not qualify for the highest public offices due to property restrictions. They include the third and fourth Solonian wealth classes (*zeugitai* and *thetes*). In addition to income, since Solon's reforms redistributed power away from the aristocrats and elevated the previously disenfranchised, all Players “have a share” (“μετέχειν”) in the state (“πόλις”). We formalize this by modelling each Player as receiving a share of rent G from public office. Let G be written as a proportion γ of Y so that $G = \gamma Y$ and the players A, S and P may receive (unequal) shares α, σ and ρ , respectively, of those rents, where $\alpha + \sigma + \rho = 1$.

Two constitutions are considered: First, a pre-Solonian *status quo ante*, an aristocratic regime, where only Player A , the rich aristocratic elite, held office and received all rents; $\alpha = 1, \sigma = \rho = 0$. Second, the *status quo* constitutional order established by Solon, where

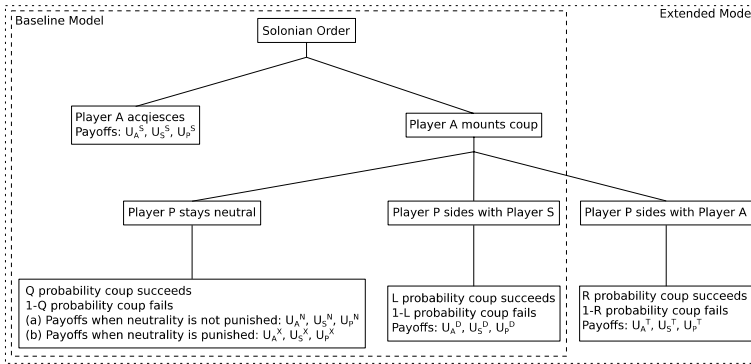


Fig. 1 The Solonian order—tyranny game w/ and w/o neutrality

all three Players take part in the government of Athens receiving (unequal) rent shares.¹⁴ We may then write $a > 0$, $\rho \geq 0$ and $\sigma = 1 - a - \rho > 0$. Hence, the Players’ payoffs under the Solonian constitutional *status quo* are

$$U_A^S = (\theta_A + a\gamma)Y \tag{1.1}$$

$$U_S^S = (\theta_S + (1 - a - \rho)\gamma)Y \tag{1.2}$$

$$U_P^S = (\theta_P + \rho\gamma)Y \tag{1.3}$$

We further assume that Player *S*, the elite player empowered by the Solonian constitution, has the power to determine the distribution of the rents, but cannot confiscate the income of the other players.

When Players *A* and *S* accept the *status quo* social peace prevails. Player *P* is generally agnostic about the political order and will only defend the Solonian *status quo* if it benefits him. Due to the privileges under the *status quo ante*, Player *A* accepts the Solonian order only if it is prohibitively expensive to challenge the Solonian elite; otherwise, he launches a coup to change the distribution of rents. The ensuing conflict destroys a fraction ϕ of incomes and rents.

Figure 1 shows the options open to the players and consequent outcomes. We investigate three different cases: First, neutrality is allowed and Player *P* is free to choose between participating and not participating in the civil war. Second, neutrality is banned and punished, so that Player *P* is punished, modelled as an income loss. Based on the resulting outcomes, we identify the shares of rents for Player *A* and *P* that Player *S* must grant to avoid conflict. Third, Neutrality is banned and Player *P* is free to ally with Player *A* to bring down the Solonian order. We then identify (i) the minimum share of the rents that stops Player *A* from mounting a coup, (ii) how this share is

¹⁴ We also investigated the possibility that Players *A* and *S* collude and form an elite cartel against Player *P*. It turns out that such an elite cartel is stable only under stringent conditions, for both *A* and *S* have strong incentives to defect and ally with *P*. Since such a coalition of *A* and *S* did not take place in Athens at the time of Solon, we skip its presentation (results available from the authors on request).

affected by the decision of Player P to stay neutral or not, and (iii) the condition leading Player S to incentivise Player P to defend the Solonian order.

3.1.1 No ban on neutrality with Player P neutral

First, we describe the case where there is no ban on neutrality and Player P stays neutral. A “winner-takes-it-all” conflict is assumed where the winner retains his income, takes the office rents, and confiscates the income of his rival, but not of the neutral. Player P suffers no income destruction, nor does he receive any rents. Denoting by Q the probability that Player A wins the conflict against Player S , the payoffs of Players A , S and P are respectively

$$U_A^N = (1 - \phi)Q(Y_A + Y_S + G) \tag{2.1}$$

$$U_S^N = (1 - \phi)(1 - Q)(Y_A + Y_S + G) \tag{2.2}$$

$$U_P^N = Y_P \tag{2.3}$$

The probability Q is assumed to be proportional to his relative income as in Jackson and Morelli (2007) and Tridimas (2015); specifically, it depends positively on his income and negatively on the income of his opponents according to the formula

$$Q = \frac{Y_A}{Y_A + Y_S} = \frac{\theta_A}{\theta_A + \theta_S} \tag{3}$$

Substituting, the payoffs are

$$U_A^N = (1 - \phi) \frac{\theta_A}{\theta_A + \theta_S} (\theta_A + \theta_S + \gamma)Y \tag{4.1}$$

$$U_S^N = (1 - \phi) \frac{\theta_S}{\theta_A + \theta_S} (\theta_A + \theta_S + \gamma)Y \tag{4.2}$$

$$U_P^N = Y \tag{4.3}$$

Player A initiates stasis (mounts a coup) to establish tyranny when $U_A^N > U_A^S$ which using (4.1) and (1.1) yields

$$\alpha^N \equiv \frac{\theta_A [\gamma - \phi(\gamma + \theta_A + \theta_S)]}{\gamma(\theta_A + \theta_S)} > \alpha \tag{5}$$

A necessary condition for $\alpha^N > 0$ is $\gamma > \frac{\phi(\theta_A + \theta_S)}{1 - \phi}$. According to (5), Player A will attempt a coup when his share of rents under the Solonian order is lower than the α^N threshold. The larger the size of α^N the more rents Player S must grant to Player A and the less rents are available for Players S and P and vice versa.

3.1.2 No ban on neutrality with Players P and S allying

Next, suppose that when Player *A* attacks the constitution, Player *P* forms an alliance with Player *S* denoted by *D*. Analogously to the previous case, the probability *L* that Player *A* wins the conflict against the alliance of *S* and *P* depends positively on his income and negatively on the income of the rival alliance

$$L = \frac{Y_A}{Y_A + Y_S + Y_P} = \frac{\theta_A}{\theta_A + \theta_S + 1} \quad (6)$$

Obviously, the probability that Player *A* wins the conflict decreases under non-neutrality of Player *P*. Hence, a non-neutrality law has a certain deterrent effect on would-be coup instigators and decreases the share that ensures their acceptance of the *status quo*. If Player *A* wins, he establishes a regime we call “tyranny”, where he gets the incomes of Players *S* and *P*, and the rents from office, $Y_A + Y_S + Y_P + G$, while Players *S* and *P* get nothing. If the alliance wins the conflict, it confiscates the income of Player *A* and obtains the rents from office $Y_A + G$. It then establishes a regime where Player *S* takes the income of Player *A* and the latter’s proportion of the rents and Player *P* receives a share ρ_S (determined by Player *S*); the defeated Player *A* gets nothing. The payoffs of *A*, *S* and *P* are respectively

$$U_A^D = (1 - \phi) \frac{\theta_A}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + 1 + \gamma) Y \quad (7.1)$$

$$U_S^D = (1 - \phi) \frac{\theta_S + 1}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + (1 - \rho_S)\gamma) Y \quad (7.2)$$

$$U_P^D = (1 - \phi) \frac{\theta_S + 1}{\theta_A + \theta_S + 1} (1 + \rho_S\gamma) Y \quad (7.3)$$

Player *A* attempts a coup if $U_A^D > U_A^S$. Using (3.1) and (7.1), the inequality is satisfied when *A*’s share of the rents is smaller than the critical value α^D shown below

$$\alpha^D \equiv \frac{\theta_A [\gamma - \phi(\gamma + \theta_A + \theta_S + 1)]}{\gamma(\theta_A + \theta_S + 1)} > \alpha \quad (8)$$

A necessary condition for $\alpha^D > 0$ is

$$\gamma^M \equiv \frac{\phi(\theta_A + \theta_S + 1)}{1 - \phi} < \gamma \quad (9)$$

Comparing α^N with α^D we find $\alpha^N - \alpha^D = \frac{\theta_A(1-\phi)}{(\theta_A+\theta_S)(\theta_A+\theta_S+1)} > 0$. That is, the threshold for attempting a coup is larger under neutrality of Player *P*. As a corollary, when *P* sides with *S* Player *A* accepts the Solonian order with a lower rent share. Figure 2 illustrates the result.

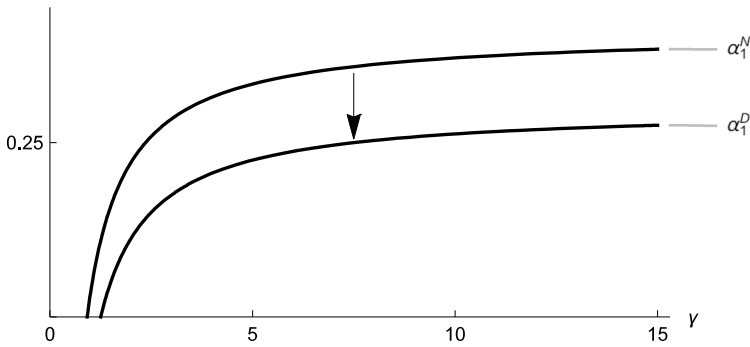


Fig. 2 Ban’s impact on the share of player A. With: $\theta_A = 1.5, \theta_S = 1.25, \phi = 0.24$

In turn, Player *P* sides with Player *S* against Player *A* when $U_P^D \geq U_P^N$ and stays neutral in the opposite case. Using (7.3) and (2.3), we obtain that Player *P* joins Player *S* for rent shares larger than the critical value ρ_S^D given below¹⁵

$$\rho_S^D \equiv \frac{\theta_A + \phi(\theta_S + 1)}{\gamma(\theta_S + 1)(1 - \phi)} < \rho_S \tag{10}$$

The offer of a share no smaller than ρ_S^D reduces the share granted to Player *A*. In view of those minimum shares, Player *S* faces a trade-off between the demands by Players *A* and *P*. He can always reduce the share of Player *A* by offering more rents to Player *P*. By reducing the share offered to *A* he risks an attack by *A*, but by offering more to *P* he increases the probability to defeat *A* and retain a larger benefit.

To determine the share of rents *S* grants to *P* we compare the payoffs of Player *S* with and without support by Player *P*. If Player *S* refrains from giving Player *P* a share of the rents, and the latter remains neutral, the former’s payoff under the Solonian constitutional order is

$$U_S^{SN} = (\theta_S + (1 - \alpha^N)\gamma)Y \tag{11}$$

If Player *S* secures the support of Player *P* without the ban on neutrality his payoff is

$$U_S^{SD} = (\theta_S + (1 - \alpha^D - \rho_S^D)\gamma)Y \tag{12}$$

Player *S* gives a share of the rents to Player *P* if $U_S^{SD} > U_S^{SN}$. Substituting (5) in (11), (8) and (10) in (12), and manipulating the inequalities, we have that Player *S* gives a share to Player *P* for values of rents larger than the critical threshold

$$\gamma^D \equiv \frac{(\theta_A + \theta_S)(\theta_A + \theta_S + 1)[\theta_A + \phi(\theta_S + 1)]}{\theta_A(\theta_S + 1)(1 - \phi)^2} < \gamma \tag{13}$$

¹⁵ From the necessary condition $U_P^D \geq U_P^N$ we may alternatively derive the inequality $\gamma > \frac{\theta_A + \phi(\theta_S + 1)}{(1 - \phi)(\theta_S + 1)\rho_S}$ which implies that Player *P* never sides with Player *S* if the available rent γ is “too small”, smaller than the quantity shown in the Right-Hand-Side of the inequality.

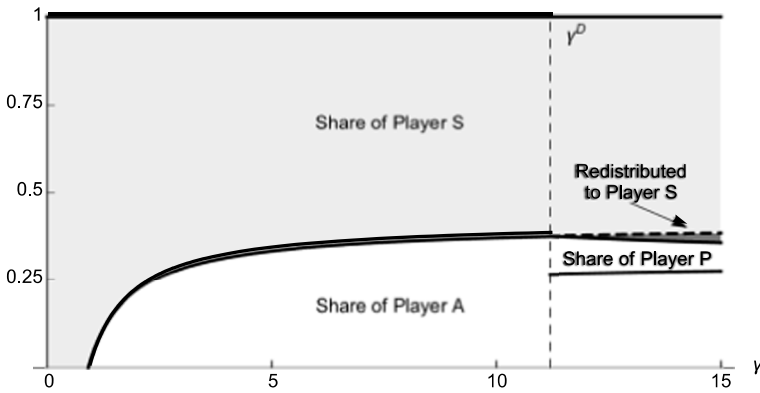


Fig. 3 Distribution of rents without a ban on neutrality. With: $\theta_A = 1.5, \theta_S = 1.25, \phi = 0.24$

for constitutional orders without a ban on neutrality in force.

Figure 3 illustrates the distribution of the rents between all Players allowing for a stable society (where the Solonian order is maintained) as a function of rents available if the ban is *not* in force. Without a ban on neutrality, Player *S* and Player *A* collude and split the total rents between them, excluding Player *P* for small total rents available ($\gamma < \gamma^D$). Only for higher total rents ($\gamma > \gamma^D$) *S* benefits from granting *P* a share of the rents to reduce the demands of *A*. Player *P*'s share is drawn redistributing from *A*'s rents, who lowers his demands because he is now confronted with a more powerful alliance. In effect, Player *S* is sufficiently powerful to force Player *A* to pay for Player *P*. It bears noting that what is taken from *A* is not fully transferred to *P*, since *S* appropriates part of it, too (dark grey area in Fig. 3).

3.2 Ban on neutrality with *P* obliged to align with *S*

The calculus of Player *P* changes when the law against neutrality mandates that Player *P* allies with Player *S*. Specifically, we assume that irrespective of who wins the conflict, Player *P* is punished if he does not participate in the conflict.¹⁶ Let the punishment be equivalent to a loss of a proportion x of the income of *P*. It is also assumed that xY is dissipated rather than accruing as an extra gain to the victorious elite player; hence, the latter has no material benefit from punishing Player *P*. The payoff of Player *P* is then written as

$$U_P^X = (1 - x)Y \tag{14}$$

Player *P* takes the side of Player *S* if $U_P^D > U_P^X$. Substituting, we have that Player *P* joins Player *S* for values of a share in the rents larger than the critical value ρ_S^X given below

$$\rho_S^X \equiv \frac{\theta_A + \phi(\theta_S + 1) - x(\theta_A + \theta_S + 1)}{\gamma(\theta_S + 1)(1 - \phi)} < \rho_S \tag{15}$$

¹⁶ Assuming that *P* is punished only when *S* wins the conflict complicates the algebra without changing the thrust of the results.

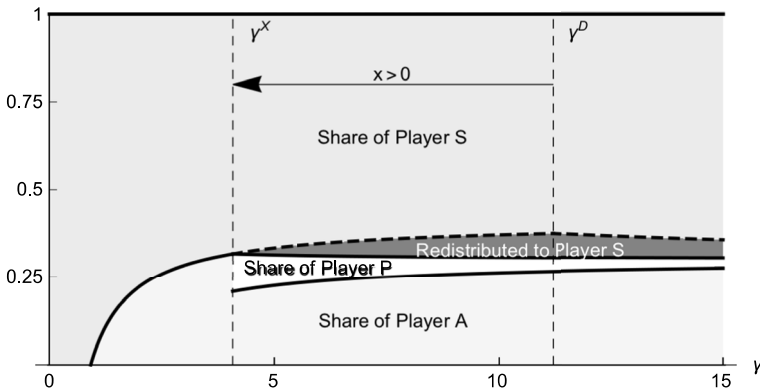


Fig. 4 Distribution of rents with the ban. With: $\theta_A = 1.5, \theta_S = 1.25, \phi = 0.24, x = 0.35$

From (15), we have that a necessary condition for $\rho_S^X > 0$ is $x < \frac{\theta_A + \phi(\theta_S + 1)}{\theta_A + \theta_S + 1}$, a condition assumed to hold. Comparing (10) and (15) we have

$$\rho_S^D - \rho_S^X = \frac{x(\theta_A + \theta_S + 1)}{\gamma(\theta_S + 1)(1 - \phi)} > 0 \tag{16}$$

With the critical share for siding under punishment smaller than the share without punishment, Player *P* now defends the Solonian constitutional order for a lower share of the rents. Accordingly, the ban on neutrality broadens the available instruments of Player *S* from carrots to sticks. Banning neutrality complements the redistribution of rents because it enables Player *S* to negatively incentivize Player *P* by punishing him for neutrality. Due to the limited resources available for positive incentives, adding negative incentives may increase the chance for social peace as it lowers the costs for abiding by the constitutional order and strengthens the social stability.

Punishing neutrality also changes the calculus of Player *S* and specifically the conditions for offering a rent share to Player *P*; his payoff is

$$U_S^{SX} = (\theta_S + (1 - \alpha^D - \rho_S^X)\gamma)Y \tag{17}$$

As before, *S* gives a share of rents to *P* if $U_S^{SX} > U_S^{SN}$ holds. Again, substituting (5) in (11), (8) and (15) in (17) and manipulating, Player *S* gives a share to Player *P* for values of rents larger than the critical value γ^X

$$\gamma^X \equiv \frac{(\theta_A + \theta_S)(\theta_A + \theta_S + 1)[\theta_A + \phi(\theta_S + 1) - x(\theta_A + \theta_S + 1)]}{\theta_A(\theta_S + 1)(1 - \phi)^2} < \gamma \tag{18}$$

Figure 4 illustrates the ban on neutrality.

The ban reduces the rent share to Player *P* to defend the Solonian order. Thus, banning neutrality introduces negative incentives as Player *P* reduces his demands for defending the Solonian constitution. Nonetheless, as Fig. 4 shows, the ban has, at least in part, a positive effect on *P* because he now receives a share of the rents for smaller total rents than before ($\gamma^D > \gamma^X$). Accordingly, banning neutrality is a kind of paternalistic instrument, forcing *P*

to reduce his demands but allowing him to participate in rent sharing. The ban is therefore an inclusive institution for Player P for smaller rents available. However, it works against inclusion for larger rents as it then helps Player S to appropriate parts of the rents of Player P .

The ban has several redistributive effects, which generally benefit Player S , the ruling Solonian elite. For small total rents available ($\gamma^X < \gamma < \gamma^D$), the share of Player P comes at the expense of Player A , who reduces his demands because of the non-neutrality of Player P . However, Player A 's share falls by more than the gain of Player P . A significant part of this reduction, as Fig. 4 shows, goes to Player S . For larger total rents ($\gamma > \gamma^D$), there is no scope for a redistribution from Player A because he would not accept the Solonian order. Nonetheless, Player S is able to redistribute rents to himself by dropping Player P , in which case the ban ceases to be an inclusive institution turning into a mean of predation instead.

All in all, a ban on neutrality, by strongly incentivizing Player P to support the Solonian constitution, creates a significant advantage for Player S , the ruling elite. We may then infer that, by not mandating P to support S , Solon was cautious to deny Player S full prerogatives in the rent-seeking competition.

3.3 Ban of neutrality with freedom of alliance

An alternative instrument to restrict the political power of elites is to introduce competition between them for supporters.¹⁷ Accordingly, we analyze how the situation changes if the ban on neutrality allows Player P to ally with the aristocratic player A against the Solonian status quo. For concreteness, we restrict the analysis to equilibria with rent shares larger than zero; otherwise, the arrangements would be unstable.

If Player P supports Player A when the latter attacks the Solonian constitution, they form an alliance denoted by T . In exchange for P 's support, Player A grants him a share of the rents ρ_A if the alliance is successful in ousting Player S . Analogously to the cases analysed above, the probability R that this alliance wins against Player S is assumed to depend positively on the alliance's income and negatively on the income of S

$$R = \frac{Y_A + Y_P}{Y_A + Y_S + Y_P} = \frac{\theta_A + 1}{\theta_A + \theta_S + 1} \quad (19)$$

It is again posited that if the T alliance loses Player S will confiscate the incomes of both A and S and get the entire rent. Upon substitution, the players' payoffs are

$$U_A^T = (1 - \phi) \frac{\theta_A + 1}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + (1 - \rho_A)\gamma)Y \quad (20.1)$$

$$U_S^T = (1 - \phi) \frac{\theta_S}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + 1 + \gamma)Y \quad (20.2)$$

¹⁷ For example, Mohtadi and Roe (2003) show that increased competition for rents due to a larger number of rent-seekers can result in both, smaller overall aggregate rents and reduced rewards to rent-seekers.

$$U_P^T = (1 - \phi) \frac{\theta_A + 1}{\theta_A + \theta_S + 1} (1 + \rho_A \gamma) Y \tag{20.3}$$

Player *A* tries to win Player *P* over if $U_A^T \geq U_A^D$; otherwise, *P* sides with *S*. Upon using (7.1) and (20.1), the previous inequality is satisfied when

$$\hat{\rho}_A^T \equiv \frac{\theta_S + \gamma}{\gamma(\theta_A + 1)} \geq \rho_A \tag{21}$$

The above shows the maximum rent share Player *A* is willing to offer to Player *P* to win him over. Given the new opportunities and expected support from *P*, *A* will now only refrain from a coup to overthrow the Solonian order if $U_A^T \leq U_A^S$. Upon using (3.1) and (13), the latter inequality is satisfied when

$$\alpha^T \equiv \frac{\theta_S + (\theta_A + 1)[\gamma(1 - \rho_A)(1 - \phi) - \phi(\theta_A + \theta_S)]}{\gamma(\theta_A + \theta_S + 1)} \leq \alpha \tag{22}$$

Recalling (8), we have, as intuition suggests, $\alpha^T = \alpha^D$ when $\rho_A = \hat{\rho}_A^T$. In other words, Player *A* is willing to offer a share of the rents to Player *P* until his own share shrinks to the size he receives when Player *P* sides with Player *S*.

Similarly, Player *S* tries to win Player *P* over if $U_S^T \leq U_S^D$. Upon using (7.2) and (10), the inequality is satisfied when

$$\hat{\rho}_S^D \equiv \frac{\theta_A + \gamma}{\gamma(\theta_S + 1)} \geq \rho_S \tag{23}$$

The latter shows the maximum rent share Player *S* is willing to offer to Player *P* to win him. Finally, Player *P* decides to side with Player *S* and defends the Solonian order against a coup by Player *A* if $U_P^T < U_P^D$. This inequality yields

$$\rho_A^C \equiv \frac{\rho_S \gamma (\theta_S + 1) - \theta_A + \theta_S}{\gamma(\theta_A + 1)} > \rho_A \tag{24}$$

As expected, ρ_A^C is a positive function of ρ_S . In other words, the more rents *S* grants to *P* the higher the offer from *A* must be to get *P* on his side. Based on these results, the payoff functions of the three players in case of conflict can be written as

$$U_A^C = \begin{cases} (1 - \phi) \frac{\theta_A + 1}{\theta_A + \theta_S + 1} [\theta_A + \theta_S + (1 - \rho_A) \gamma] Y = U_A^T, \rho_A > \rho_A^C \\ \frac{1}{2} U_A^T + \frac{1}{2} U_A^D = U_A^E, \rho_A = \rho_A^C \\ (1 - \phi) \frac{\theta_A}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + 1 + \gamma) Y = U_A^D, \rho_A < \rho_A^C \end{cases} \tag{25a}$$

$$U_S^C = \begin{cases} (1 - \phi) \frac{\theta_S + 1}{\theta_A + \theta_S + 1} [\theta_A + \theta_S + (1 - \rho_S) \gamma] Y = U_S^D, \rho_A > \rho_A^C \\ \frac{1}{2} U_S^T + \frac{1}{2} U_S^D = U_S^E, \rho_A = \rho_A^C \\ (1 - \phi) \frac{\theta_S}{\theta_A + \theta_S + 1} (\theta_A + \theta_S + 1 + \gamma) Y = U_S^T, \rho_A < \rho_A^C \end{cases} \tag{25b}$$

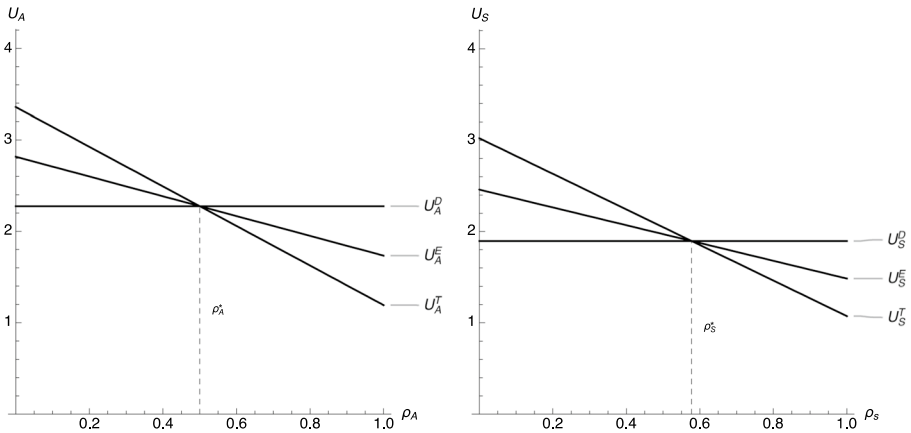


Fig. 5 Payoff functions for players A (left) and S (right). With: $\theta_A = 1.5, \theta_S = 1.25, \phi = 0.24, Y = 1, \gamma = 5$

$$U_P^C = \begin{cases} (1 - \phi) \frac{\theta_S + 1}{\theta_A + \theta_S + 1} (1 + \rho_S \gamma) Y = U_P^D, \rho_A > \rho_A^C \\ \frac{1}{2} U_P^T + \frac{1}{2} U_P^D = U_P^E, \rho_A = \rho_A^C \\ (1 - \phi) \frac{\theta_A + 1}{\theta_A + \theta_S + 1} (1 + \rho_A \gamma) Y = U_P^T, \rho_A < \rho_A^C \end{cases} \tag{25c}$$

To simplify, we assume that Player *P* is indifferent if $\rho_A = \rho_A^C$ holds. In this case, each one of the elite players assumes that they both have the same chances to convince *P* to support them and thus expect to receive half the respective payoffs. Figure 5 illustrates the payoff functions for the elite players.

As both players maximize their payoffs under consideration of their opponents best possible responses, the concept of Nash equilibria is used to solve the problem of choosing the values of rents maximizing their benefits. In this case, a unique Nash equilibrium exists and both players offer their maximum willingness to pay for the support of Player *P*; see Appendix 1 for the Proof. Accordingly,

$$\rho_S^* = \hat{\rho}_S^D = \frac{\theta_A + \gamma}{\gamma(\theta_S + 1)} \quad \text{and} \quad \rho_A^* = \hat{\rho}_A^T = \frac{\theta_S + \gamma}{\gamma(\theta_A + 1)} \tag{26}$$

are the equilibrium shares, players *S* and *A* offer to Player *P*. Given the structure of the model, Player *P* is indifferent regarding his support as $\rho_A^C = \rho_A^*$ (for $\rho_S = \rho_S^*$) also holds true. Accordingly, Player *S* grants ρ_S^* as the share of rents to Player *P* and, at the same time, Player *A* commits to ρ_A^* if he would be able to overthrow the Solonian constitution with the help of Player *P*. Based on that result, Player *A* receives a share of the rents amounting to.

$$\alpha_S^* = \alpha^D = \frac{\theta_A [\gamma - \phi(\gamma + \theta_A + \theta_S + 1)]}{\gamma(\theta_A + \theta_S + 1)} = \alpha^T \quad \text{for } \rho_A = \rho_A^* = \frac{\theta_S + \gamma}{\gamma(\theta_A + 1)} \tag{27}$$

under the Solonian constitutional order. A necessary condition for $\alpha_S^* > 0$ is, again,

$$\gamma^M \equiv \frac{\phi(\theta_A + \theta_S + 1)}{1 - \phi} < \gamma \tag{9}$$

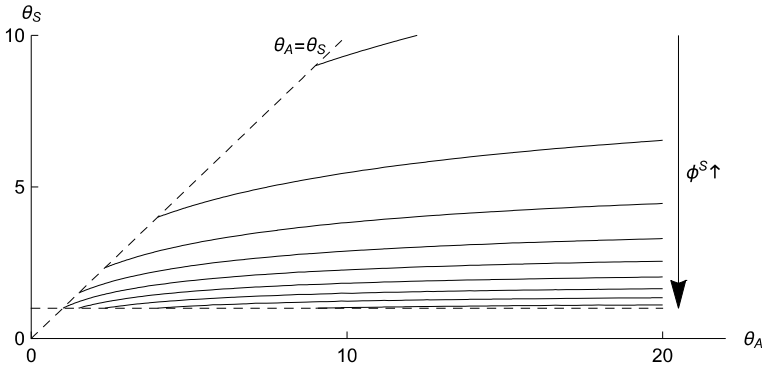


Fig. 6 Contours of threshold for stable distributions. With: $\theta_A = 1.5, \theta_S = 1.25, \phi = 0.24$

The share of Player S, σ_S^* , is the remainder and amounts to

$$\sigma_S^* = 1 - \alpha_S^* - \rho_S^* = \frac{\gamma\theta_S(\theta_S + 1) + \theta_A^2[\phi(\theta_S + 1) - 1] + \theta_A(\gamma + \theta_A + 1)[\phi(\theta_S + 1) - 1]}{\gamma(\theta_S + 1)(\theta_A + \theta_S + 1)} \tag{28}$$

This is the only possible stable distribution because Player P never remains neutral in a conflict under those conditions, even for $x = 0$; see Appendix 2 for the proof.

Finally, this distribution is also sufficient to prevent Player S from launching a coup when

$$\phi^S \equiv \frac{\theta_A}{(\theta_A + \theta_S)(\theta_S + 1)} < \phi, \tag{29}$$

i.e., for not too-low costs of conflict; see Appendix 3 for details. At the same time, $\sigma_S^* > 0$ holds true for all $\phi > \phi^S$, implying a stable distribution.

4 Towards a better understanding of Solon’s ban of neutrality

The model provides useful insights to Solon’s law, especially, its consequences for the distribution of rents and social peace. If the destruction from conflict is large enough ($\phi > \frac{\theta_A}{(\theta_A + \theta_S)(\theta_S + 1)}$) and the total rents available are also sufficiently large ($\gamma > \frac{\phi(\theta_A + \theta_S + 1)}{1 - \phi}$) it is possible for all social groups to accept the Solonian constitution and refrain from violent conflict for redistribution. In this case, the Solonian elite can propose a distribution of rents acceptable to the Athenian society thus securing social peace.

A closer look at ϕ^S leads to the following inferences regarding social cohesion, further illustrated in Fig. 6. Specifically, (i) the lower the income of Player S is and (ii) the higher the difference between the incomes of A and S , the less stable is the society in the sense that the Solonian elite (Player S) rejects its own Solonian constitution and tries to appropriate the income of Player A . This highlights that over and above the distribution of rents, the distribution of initial incomes is crucial for social peace. That is, redistribution of rents is not enough to prevent civil conflict if the initial income gap between the aristocratic elite A and the rising Solonian class S is too large.

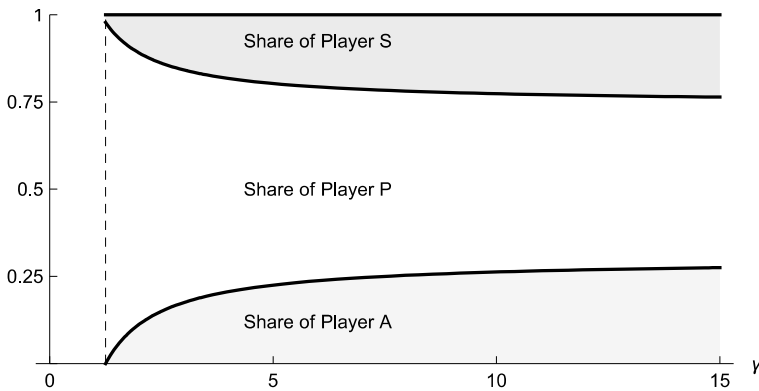


Fig. 7 Players' share of rents w/o ban and mandatory alliances. With: $\theta_A = 1.5$, $\theta_S = 1.25$, $\phi = 0.24$

Indeed, one may well believe that Solon was fully aware of the risk from unequal distribution of properties for social stability and tried to address it with the bold policy of freeing farmers from their debts and the obligation of fathers to teach their sons a trade. Figure 7 illustrates the distribution of rents in the absence of a mandatory alliance between *S* and *P*. The bargaining position Player *P* has now improved considerably. Since the elites must compete for his support, he enjoys a larger share of rents. The ban on neutrality is unequivocally beneficial for Player *P*, and it comes at the expense of Player *S*; see Appendix 4 for details. Accordingly, the ban on neutrality complemented with the freedom to choose an ally is a cohesive institution in the sense that it prevents both, the marginalization of Player *P* and excessive rent-seeking by Player *S*. At the same time, it is also an inclusive political institution because it forces Player *P* to engage in politics. Interestingly, cohesive institutions do not necessarily consist of positive incentives. As noted by Tullock (2005), negative incentives assist to reach a peaceful social equilibrium enhancing efficiency. The results also imply that paternalistic policies may sometimes overcome political apathy.

An interesting insight from the model is its implication for social peace. Solon's ban on neutrality illustrates that inclusive institutions emerge not only from the need to defend against external enemies, but also from inter-elite competition and, hence, from the threat of civil war. Accordingly, encouraging competition between elite groups can increase the relevance of formerly marginalized groups increasing their leverage and, somehow counterintuitively, lead to social peace.¹⁸ This result further underpins the ability of cohesive institutions to reduce conflict. Institutions ensuring the representation of all societal groups, yield more inclusive distributions of rents and thus lower the incentives for violent redistributions.

It is, of course, theoretically possible for Player *P* to rise against the regimes of Players *A* or *S* and, if he prevails in the ensuing fight, to enact his most preferred distribution. However, we abstract from this case not only because of space limits but, more importantly, because historically this did not happen. On the one side, this absence of uprising by the poor accords with the insights of Olson (1965) that collective action by the would-be

¹⁸ This result is probably best enunciated by the Latin proverb *si vis pacem, para bellum* (if you want peace prepare for war).

rebels fails to materialize because of the free-riding problem, and of Tullock (2005) that participation or non-involvement in revolutionary uprising is mainly affected by net private gains.¹⁹ On the other, it may indicate an acceptance of the legitimacy of the prevailing income distribution.

5 Conclusions

At first blush, it is baffling that Solon did not mandate citizens to defend the constitution he introduced but only forbade them from staying neutral. Using the insights of political economy and especially contests for rent seeking, we argue that Solon's law against neutrality rested on sound reasoning. We modelled Solon's constitution as one designed for a society divided in three groups, a rich hereditary aristocracy, which monopolized power before the Solonian constitution, a rival wealth-based commercial elite, called the new Solonian elite, and the poor, who are enfranchised only partly.

In accordance with a priori expectations, when the poor are allowed to stay neutral and decide to do so, the aristocrats will attempt a coup when their share of government rents under the Solonian order is lower than a minimum threshold given by Eq. (5). However, when the poor join the Solonian elite and are awarded part of the rents, the minimum threshold that makes the aristocrats accept the new constitution falls, provided that the size of rents exceeds the lowest value shown by Eq. (13); if the latter does not hold the wealth elite is better off colluding with the hereditary elite and excluding the poor from sharing rents.

When neutrality is banned, so that the poor lose part of their income as a punishment, a lower rent share brings the poor to side with the Solonian elite against the birth-aristocracy. Therefore, the ban on neutrality benefits the Solonian elite. But a ban on neutrality, without a concomitant obligation to support the Solonian elite, opens the possibility that the birth-aristocracy also offers a share of rents to the poor in an alliance against the Solonian elite. We worked out conditions when the poor are indifferent between supporting the different elites. We find that in the absence of a mandatory alliance between Player *S* and *P*, the ban on neutrality is unequivocally beneficial for the poor. In addition, we found that rent redistribution is not enough to prevent conflict if the initial income differences between the birth-aristocrats and the new elite is too large. If it is, the latter group will be tempted to violently appropriate the income of the former.

¹⁹ Building on Tullock's intuition, Apolte (2012) shows that income inequality is not sufficient and at best only necessary for revolution.

Appendix

A Proof of the unique Nash equilibrium

This proof follows the logic of the well-known textbook example for the unique Nash equilibrium of Bertrand competition with homogeneous goods.²⁰ First, we will show that

$$\rho_S^* = \hat{\rho}_S^D \equiv \frac{\theta_A + \gamma}{\gamma(\theta_S + 1)} \quad \text{and} \quad \rho_A^* = \hat{\rho}_A^T \equiv \frac{\theta_S + \gamma}{\gamma(\theta_A + 1)} \quad (30)$$

is a Nash equilibrium, followed by the proof that it is also unique. To show that (30) is a Nash equilibrium, it is sufficient to show that no player could improve his payoffs by unilaterally changing his strategy. For the proof, it is important to remember that if (30) holds true, the following also holds true

$$U_i^T = U_i^D = U_i^E = U_i^C \quad \text{for} \quad i = A, S \quad (31)$$

as $\hat{\rho}_S^D$ and $\hat{\rho}_A^T$ are both players' maximum willingness to pay for an alliance (see also Fig. 5). In other words, both Players are indifferent whether they (i) receive the full support of Player P , (ii) receive or do not receive the support with equal probabilities, or (iii) receive no support at all. Accordingly, unilaterally reducing the share of Player P ρ_i (with $i = A, S$) and, hence, losing any support by Player P , does not increase the respective player's payoff. At the same time, since

$$\frac{\partial U_S^T}{\partial \rho_A} = -\frac{\gamma(\theta_A + 1)(1 - \phi)Y}{\theta_A + \theta_S + 1} < 0 \quad \text{and} \quad \frac{\partial U_S^D}{\partial \rho_S} = -\frac{\gamma(\theta_S + 1)(1 - \phi)Y}{\theta_A + \theta_S + 1} < 0 \quad (32)$$

increasing the share offered to Player P and, hence, gaining his full support, does reduce the respective player's payoff. Accordingly, (30) must be a Nash equilibrium.

To show that this Nash equilibrium is also unique, we will exclude all other possible Nash equilibria. It is intuitively plausible that there cannot be any stable Nash equilibrium with $\rho_i > \rho_i^*$ (with $i = A, S$) because at least one player has an incentive to reduce the share offered to Player P as $U_A^D > U_A^T$ for $(\rho_A > \rho_A^*)$ and $U_S^T > U_S^D$ for $(\rho_S > \rho_S^*)$.²¹ The same is true for all symmetric ($\rho_S = \rho_A$) and asymmetric ($\rho_S \neq \rho_A$) combinations of ρ_S and ρ_A with $\rho_i < \rho_i^*$ (with $i = A, S$). In all those cases, at least one player has an incentive to increase the share of Player P in order to outbid his opponent and gain the full support of P due to $U_A^D < U_A^T$ for all $\rho_A > \rho_A^*$ and $U_S^T < U_S^D$ for all $\rho_S > \rho_S^*$. Accordingly, there is no other stable Nash equilibrium.

B Proof of the non-neutrality of player P .

The penalty for neutrality x reduces the willingness of Player P to remain neutral. Accordingly, if Player P would not remain neutral for $x = 0$ he would not remain neutral for $x > 0$

²⁰ See, e.g., Mas-Colell et. al. (1995, p. 388f.) for details.

²¹ Recall that $\rho_S^* = \hat{\rho}_S^D$ and $\rho_A^* = \hat{\rho}_A^T$ are maximum willingness to pay.

either and it would be sufficient to rule out the former case to prove the non-neutrality of Player P for any $x \geq 0$.

Player P would remain neutral in a conflict if, at least, $U_P^N \geq U_P^T$ or $U_P^N \geq U_P^D$ with $\rho_i = \rho_i^*$ ($i = A, S$) and $x = 0$ hold true. Due to the inequalities' symmetry, both simplify to

$$U_P^T = U_P^D = \frac{(1 - \phi)(\gamma + \theta_A + \theta_S + 1)Y}{(\theta_A + \theta_S + 1)} \leq Y = U_P^N \text{ for } \rho_i = \rho_i^* \text{ with } i = A, S \quad (33)$$

which yields

$$\gamma^C \equiv \frac{\phi(\theta_A + \theta_S + 1)}{1 - \phi} \geq \gamma \quad (34)$$

Since $\gamma^C = \gamma^M$ and, as defined in (9), $\gamma > \gamma^M$, (34) cannot be true. Accordingly, Player P would never remain neutral.

C Proof of acceptance by player S .

The Solonian elite, Player S , could also initiate a coup against the Solonian constitution. In this case, Player S would establish a tyranny, appropriating all rents and incomes.

With $U_S^T = U_S^D$ for $\rho_S = \rho_S^*$, it is sufficient to control for $U_S^T < U_S^S$ of (1.2), with $\alpha_S = \alpha_S^*$ and $\rho_S = \rho_S^*$, so that $\sigma_S = 1 - \alpha_S^* - \rho_S^*$, in order to rule out a coup by Player S . This inequality yields

$$\phi^S \equiv \frac{\theta_A}{(\theta_A + \theta_S)(\theta_S + 1)} < \phi \quad (29)$$

Accordingly, Player S refrains from a coup for not-too-low costs of conflict.

D Proof of the Advantageousness for Player P .

The institution of the ban would be beneficial for Player P if $\rho_S^* > \rho_S^X$ holds true since U_P^S increases in ρ_S . Again, it is sufficient to show that the inequality holds for $x = 0$ in order to show that it holds for $x \geq 0$ because ρ_S^X decreases in x .

For simplicity, we prove $\rho_S^* > \rho_S^X$ by contradiction, ruling out the opposite $\rho_S^* \leq \rho_S^X$ (both for $x = 0$). Substituting from (12) and (26) and simplifying $\rho_S^* - \rho_S^X \leq 0$ yields

$$\frac{1}{1 + \theta_S} \left(1 - \frac{\phi(\theta_A + \theta_S + 1)}{\gamma(1 - \phi)} \right) \leq 0 \Rightarrow \gamma^{AC} \equiv \frac{\phi(\theta_A + \theta_S + 1)}{1 - \phi} \geq \gamma \quad (36)$$

With $\gamma^{AC} = \gamma^M$ and, as defined in (9), $\gamma > \gamma^M$, (35) cannot be true. Accordingly, the institution of the ban is always beneficial for Player P .

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