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RATIONAL IGNORANCE AND THE PUBLIC CHOICE OF REDISTRIBUTION

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Abstract

This paper studies the role of citizens' demand for political information in elections and provides a possible explanation for the poor empirical support encountered by political economy models of income redistribution. It shows that incentives to gather political information may derive from its relevance to private choices. Under quite mild assumptions, the demand for political information is increasing in income. Information affects citizens' responsiveness to electoral platforms, and vote-seeking political parties should take this into account: as a consequence, redistribution will generally be less than predicted by the median voter theorem. Moreover, in contrast with what most literature seems to take for granted, an increase in inequality will not unambigously increase redistribution. Finally, introducing endogenous information may lead some policy restrictions to have effects quite different from those intended.

JEL classification: D31, D72, D83, H50.

Keywords: redistribution, median voter, information, inequality.

Contents

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1. Introduction[1]

Since the early stages of the economic theory of politics, Downs pointed out that in a sizable electorate "the returns from voting are usually so low that even small costs may cause many voters to abstain". This carries implications not only for political participation but also for the desire to be informed about political issues. If there is a cost of acquiring information about the candidates and their platforms, then we should expect not only rational abstention but also "rational ignorance" on political issues.

This consideration implies a substantial lack of information by citizens about candidates and their proposals. The fact that many people actually vote and that political information is still available in newspapers would be simply reduced to a matter of preferences: political information may be enjoyable *per se*, not unlike sports news[2]. This is equivalent to admitting that preferences for political information, like all preferences, are outside the domain of standard economic theory[3]. If this was true then the chances of being informed or of showing up at the voting booth could be expected to be independent of observable economic variables, which seems to be at odds with most empirical research[4].

This paper argues that, apart from the obvious role of personal preferences, the demand for political information can be explained in terms of incentives. The main point is that rational

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[1] This paper is part of a PhD dissertation at the London School of Economics. I am grateful to my advisor Tim Besley for helpful discussions and valuable comments on my modelling attempts. I also received useful comments and suggestions from Fabrizio Balassone, Massimo Bordignon, Andrea Brandolini, Giacomo Corneo, Vincenzo Galasso, Roger Myerson, Torsten Persson, Jean-Francois Laslier, Federico Revelli, Kevin Roberts, Cecilia Testa, Stan Winer and Alberto Zanardi as well as from participants in the Young Economists Meeting in Amsterdam, the Workshop on Heterogeneous Interacting Agents in Genoa, the Summer School in Political Economy at CORE, the Econometric Society Meetings in Cancun and Santiago, the EEA Meeting in Santiago, the IIPF Meeting in Moscow, the SIEP Conference in Pavia, and seminars at LSE and STICERD. The usual disclaimer applies. Financial support from the European Commission under the TMR scheme (Marie Curie Fellowship) and from ESRC is gratefully acknowledged.

[2] Analogously, Riker and Ordershook (1968) explain voters' turnout in general elections by including a sense of citizen's duty in individuals' preferences.

[3] In the words of Downs, "a rational man can become well informed for four reasons: 1) he may enjoy being well informed for its own sake, so that information as such provides him with utility; 2) he may believe the election is going to be so close that the probability of his casting the decisive vote is relatively high; 3) he may need information to influence the votes of others (...); 4) he may need information to influence the formation of government policy as a lobbyist. Nevertheless, since the odds are that no election will be close enough to render decisive the vote of any one person, or the votes of all those he can persuade to agree with him, the rational course of action for most citizens is to remain politically uninformed" (Downs, 1957).

[4] See for example Matsusaka (1995) and the references given there.

ignorance is the consequence of an artificial separation between politics and the economy. It seems rather intuitive that expectations on policies can be relevant to private decisions. This generates a demand for political information to be used for private purposes. Under quite mild assumptions, this demand is positively correlated with income: in other terms, we can expect the rich to be systematically better informed than the poor, independently of any demand for information purely as a consumption good.

This idea can help in explaining redistributive policies. In recent economic literature explanations of redistribution based on political processes have gained increasing consent. Whereas lobbying models have mainly been employed to explain redistribution towards special interest groups, to study the determinants of general redistributive programmes the main avenue seems to be analyzing voting decisions and political competition in general elections.

According to voting models of redistribution based on the median voter theorem, income inequality should increase redistribution as long as it increases the distance between average income and the income of the pivotal voter (Roberts, 1977); this result has been applied to a variety of situations to explain the size of the public sector, low growth rates, increasing intergenerational transfers and so on. However, it is also fair to say that this theory does not enjoy solid support from empirical investigations. Even though the reduced forms referring to specific situations are generally compatible with the data, when moving to structural-form analysis (linking inequality to some measure of redistributive transfers), support is generally weak and coefficients often show signs different from those expected[5]. There are various possible explanations for this unsatisfactory empirical support[6]; however, it seems clear that the theory, though representing a useful benchmark, provides a simplistic representation of how democratic systems work. Other institutional elements and country-specific features are likely to affect the policy outcomes.

It is worth remembering that this benchmark depends on some crucial assumptions that have been challenged on a variety of grounds. First of all, it requires unidimensionality of

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[5] For examples of reduced form analysis see Alesina and Rodrick (1994) and Persson and Tabellini (1994). Estimations of structural relationships between redistributive transfers and inequality are given in Perotti (1994) and Lindert (1996).

[6] Among other things, it is worth remembering that for some countries data are not completely reliable.

the policy space. When public policy is considered in a multidimensional space, then an equilibrium may not exist or it may assume very different characteristics[7]. In particular, political platforms proposed by candidates do not necessarily converge. Also, the median voter theorem requires that political parties be perfectly able to commit to their proposed policies. When candidates are unable to make credible commitments then the tendency to platform divergence in equilibrium is reinforced[8].

This paper points in a different direction. The model unveils a possible relationship between incentives to gather political information and preferences over redistribution. Information acquisition might be non-neutral for voting outcomes: indeed, our model implies a substantial heterogeneity in awareness on policies, which could affect political competition and eventually policy choices. It will be shown how this may provide a possible explanation of the weak evidence for the traditional benchmark.

The paper is organized as follows. The next section briefly discusses the main features of the model of political information gathering, stressing its original elements as a theory of the demand for information. Section 3 presents a simple model of Downsian political competition in which both private and public decisions must be made by citizens. In Section 4 we derive the demand for political information and show that incentives to be informed on politics are increasing in agents' initial endowments. In Section 5 we solve the model and analyse the role of information on political equilibrium. Section 6 discusses the main implications of the model for the interaction between gross income inequality and redistribution. Section 7 briefly discusses the main normative issues at stake in this analysis and the role of coordination failures in information acquisition. Section 8 concludes.

2. Information on politics

Most models of voting assume perfect information. Citizens are therefore perfectly informed on political platforms and perfectly able to understand the consequences of policies on their own well-being. Models with asymmetric information have considered either a representative voter imperfectly informed on candidates (e.g. Harrington, 1993, Morris and

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[7] See for example Besley and Coate (1997).

[8] See Alesina (1987 and 1988) for partisan models of two-party electoral competition. Besley and Coate (1997) also consider policy-oriented citizen-candidates.

Coate, 1995) or fixed political alternatives (e.g. Feddersen and Pesendorfer, 1996). Also, information transmission in elections has been considered by Stromberg (2001a and 2001b), who stresses the role of mass media as suppliers of information and their influence on economic policies, and Besley and Pande (1998), who tackle some normative issues.

This paper focusses on the demand for political information. It is clear that in an economic theory of politics there is no simple explanation for any type of political participation, where participation must be taken in the broad sense of voting, taking part in political organizations, acquiring political information and so on.

One first possibility, as noted, is that political information is demanded as a consumption good and not for decision-making: most people seem to enjoy being informed on many things, even when this does not enable them to make better decisions. In this case one should ask about the nature of this good and, in particular, whether it is a normal good. This is clearly an empirical matter; if, as seems reasonable, political information is a normal good, then the rich can be expected to be more informed than the poor and therefore more responsive to policy announcements: all the results we present in this work would be valid *a fortiori*.

In this paper, however, we refer only to information as it is considered in decision theory, ignoring information as a consumption good and not relying on normality. In fact, the premise that political information is rarely relevant to useful decision-making relies on an artificial modelling separation between politics and the economy. Our working assumption, instead, is that political information may be acquired for private purposes and that this incentive is relevant.

Many pieces of information may be relevant when voting even though they were acquired for some other purpose. For example, information on fiscal variables may be relevant to investment decisions and at the same time convey information on economic policy; information on the quality of some public service (for example health) may be useful to know whether it is worthwhile using privately available alternatives and at the same time convey information on the effort of the current administration to provide good services. Moreover, at election time, political information may be acquired to form more accurate expectations on future policy: investment decisions today depend on expectations on future taxes; choosing a public or a private school today involves expectations over the condition of the educational system in a few years; and so on.

Sometimes the behaviour of political agents may reveal, apart from policies, something about the external world that is relevant to private decision making. Political parties have every incentive to collect information for their own action, so accurate observation of their choices can convey information on many variables that are unobservable (or too costly to observe) to the private citizen.

In this paper the notion of information will have some characteristics not often considered in the literature. First of all, information does not come effortlessly: agents must spend effort and time to gather and process information. Secondly, acquiring information is an activity with uncertain returns: more time and effort makes it more likely to get better information, but there is no certainty about what and how much is going to be known. Third, information is considered as freely accessible to all: this makes our analysis particularly suited for information available in the mass media. In fact, the revenue of most newspapers and broadcasts comes from advertising: attracting a larger public raises the value of units to sell to advertisers[9]. The consumer in this case does not pay information in cash; in any event, this cost is quite low compared with some other opportunity cost.

It is important to stress that defining the value of information and deriving a demand for it requires dealing with some problems posed by its special characteristics. First, information demand is a derived demand: information is valuable because it enables people to make better choices[10]. This means that information cannot be put in the commodity space when defining preferences. As a consequence, relevant nonconcavities may arise to complicate the analysis, leading to an unsatisfactory theory overall[11]. Second, to specify a model of information demand we need a clear definition of the information available, its costs and the decision making process. Information is valuable only when there is uncertainty on variables that are relevant to decision making. Third, there is no easy way to define the quantity of information. Given a space of possible states S, we can say that signal s is more informative than signal $s^{'}$ when it induces a finer partition of the state space: but this does not provide a complete order of signals, as many partitions are simply not comparable with this criterion. Thus, a complete

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9 See the discussion of this point in Stromberg (2001a).

10 We are referring to the notion of information in decision theory. All other information can clearly be included in the category of leisure.

11 See for example Radner and Stiglitz (1984).

ordering of signals may be obtained only with reference to a score function, i.e. with reference to how the signals are valuable in terms of the decisions to be made: this means that there is no objective, permanently valid definition of the quantity of information in economics[12].

Previous studies on information demand include Kihlstrom (1974) and Arrow (1986). In Arrow, information is demanded for portfolio decisions under uncertainty. The analysis is limited to this specific case and considers a given specification for the utility function (CES). Information is provided by a signal on returns, and the quality of the signal is given by its precision. Kihlstrom provides a general theory of information demand about product quality, when consumers are interested not directly in commodities but in some desirable attributes they may have. The quantity of information is defined using, as in Blackwell (1953), the concept of sufficiency: if an observable random variable s is sufficient for $s^{'}$, then s delivers more information than $s^{'}$. In both papers the cost of a better signal is a monetary cost and there is no uncertainty on the quality of the signal.

Our analysis of the demand for information will be quite simple but also sufficiently general for our purposes; in a sense, it is in the Becker tradition of the study of individual production functions: agents may "produce" information for their personal use by providing the necessary inputs. We consider a generic state-dependent cardinal utility function and we will explicitly introduce an effort dimension for information gathering and uncertainty on information acquisition. This takes into account some elements that are particularly relevant when information is gathered from mass media.

3. The general framework of the model

In the following model political competition is limited to a Downsian two-party system with full commitment. Of course this implies that the model has all the limitations of the Downsian analysis, which we do not intend to focus on here. It is instead important to compare our results with a standard Downsian model of political competition. Even though the analysis is kept as simple as possible, this does not preclude the applicability of this framework to more sophisticated models of political competition.

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[12] The Shannon measure of the quantity of information, derived in a different context, has proved to be of little use in economic theory. See Shannon (1948).

Our economy consists of a continuum of agents. Each agent's preferences will be represented by a continuous utility function

(1) $$u(\mathbf{x}, e|a) = U(\mathbf{x}|a) - ve$$

where **x** is a vector of private goods (with prices **p**), $a \in A \equiv [\underline{a}, \overline{a}]$ is a public policy parameter and $e \in E = [0, \frac{1}{\pi}]$ is effort devoted to information gathering, with $v = \omega + \varepsilon$ a parameter of effort disutility. We assume ω to be a cost that is common to the whole population and distributed according to the function $p_\omega(\varpi, \sigma_\omega^2)$ with $S_\omega = \{\omega | p_\omega(\varpi, \sigma_\omega^2) > 0\} \subset \Re_+$; $\varepsilon \sim p_\varepsilon(\overline{\varepsilon}, \sigma_\varepsilon^2)$ is an idiosyncratic shock with $S_\varepsilon = \{\varepsilon | p_\varepsilon(\overline{\varepsilon}, \sigma_\varepsilon^2) > 0\} \subset \Re_+$. We assume people have identical preferences: hence the only ex ante source of heterogeneity is their initial endowment. An agent with endowment m has a choice set given by

(2) $$X_m = \{\mathbf{x} | \mathbf{px} \leq m(1 - \pi e)\}$$

where π is a positive parameter, equal for all agents, reflecting the possible monetary costs induced by information gathering (for example, via a reduction in labour supply). Interpreting the initial endowment as full income, we will summarize income distribution in the population by a continuous density function $f(m)$. Also, the public policy parameter a is relevant to the private choice of the bundle $\mathbf{x}$.

For the moment let us focus on the first component of the utility function, neglecting the choice of e and the role of π. Let us also assume that a is fixed and known with certainty. From the constrained maximization of the utility function we get the optimal private choice $\mathbf{x}^*(a, m, \mathbf{p})$ and the indirect utility function $V(a, m, \mathbf{p})$. We make the following assumptions:

Assumption 1$U(.) \in \Re_+$ is quasi-concave and homogeneous of degree 1 in $\mathbf{x}$.

Assumption 2$V(a, m, \mathbf{p})$ satisfies the single crossing condition: $\forall a^{'} > a, \forall m^{'} > m : V(a^{'}, m^{'}, \mathbf{p}) \geq V(a, m^{'}, \mathbf{p}) \Rightarrow V(a^{'}, m, \mathbf{p}) \geq V(a, m, \mathbf{p})$ and $V(a^{'}, m^{'}, \mathbf{p}) > V(a, m^{'}, \mathbf{p}) \Rightarrow V(a^{'}, m, \mathbf{p}) > V(a, m, \mathbf{p})$.

Given the continuity of the functions involved, we can represent the preferred policy of an agent with income m as a function $a = z(\frac{m}{\mu})$, where μ is the average income in the population; we make the following assumption on policy preferences:

Assumption 3$z^{'} < 0$.

Although Assumption 1 clearly restricts the behaviour pattern of our agents, it should be noted that the class of utility functions we consider is still fairly general, comprising some of the standard functions most widely used in economic models.

From Assumptions 2 and 3 it is clear that agents are heterogeneous in their preferences over policy issue a. We can think of a as any policy issue; we only require preferences on a to be somehow related to income; thus, a could be some specific type of public good or a redistributive transfer in a second-best environment[13]: hence the desired level of a will be decreasing in each agent's own income and increasing in average income (the distance from μ measures how desirable redistribution is for an agent with income m) and the policy preferred by the pivotal voter (usually with income below the average) will depend on the distance of that voter's income from the average. Notice that assuming $z(.)$ depending only on the ratio $\frac{m}{\mu}$ also means that the level of wealth of a community does not matter for preferences over a; in other words we exclude the presence of any Wagner's law embedded in individual preferences. Whenever we refer to a given income distribution $f(m)$, we simply normalize $\mu = 1$, to avoid confusion. For the rest of this section we indicate the distribution of the ideal a (the argmax of the indirect utility function) across the population with $g(a)$.

Our agents act on the economy by their private decisions and may also affect the public decision with their votes. From now on we also assume that a is unknown.

In our environment there are two parties (A and B) competing for office. They are able to commit to their platforms and care only about maximizing votes. Thus they have no preference for any platforms: these are used only instrumentally to convince voters.

Parties' platforms are announced publicly but are observable only if some effort e is devoted to information gathering. More precisely, we will assume that the probability of observing the vector of announcements $\{a_A, a_B\}$ is given by $q(e)$, where $q(.)$ is an increasing and concave function. One possible interpretation of this assumption is that parties' communications are very often transmitted to voters only indirectly, by the mass media. Also, political platforms are very complex and the ultimate effect on an agent's finances is never very clear. Researchers use quite sophisticated models to approximate the effects of simple

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[13] One possible situation leading to this framework is the choice of the tax rate in a proportional tax system with lump sum transfer and balanced budget. This is the situation analysed in Roberts (1977) and Meltzer and Richard (1981).

policies, so there is no reason why a voter should completely and immediately understand political platforms and their consequences. Although this critique could be extended to many other models in economics, it seems particularly relevant when we come to public policies, because of their intrinsic complexity.

The timing of the model is represented in figure 1: first of all Nature selects ω for the whole community and the idiosyncratic shocks ε for each citizen. Citizens only learn their own v. Politicians, however, may observe the realization ω. Both citizens and politicians know the distribution of policy preferences. In period 1 the two parties simultaneously announce their platforms. Citizens spend their desired amount of effort in acquiring information and afterwards decisions are made, i.e. private choices are undertaken and people cast their votes on the basis of the information they have. Finally the announced policy of the winner party is implemented and payoffs are realized for all citizens.

Note that the model can easily accommodate a series of complications that would not change anything substantial. First of all, other sources of uncertainty could be added with no significant consequences. For example preference distribution $g(a)$ could be uncertain. If there are two possible distributions $g_1(a)$ and $g_2(a)$ with respective probabilities p and $(1-p)$ then a state of the world would be defined by realizations of information costs and preference distribution. An agent could learn something by observing his or her own preferences but would still be substantially uncertain, making information valuable. This possibility will be considered in example 2.

Another possibility is to allow only for the observation of a signal s on platfoms, rather than the platforms themselves. In this case, assuming that the joint distribution of a and s satisfies the monotone likelihood ratio property, knowing s would reduce uncertainty and the set of possible political equilibria, still making information gathering an activity with positive returns. Note also that for our purposes the following analysis would be the same if the function $U(.)$ was represented as $U(\mathbf{x}|\psi(a))$ where $\psi(a)$ is any variable relevant to private decision-making and affected by public policies (for example, the interest rate).

We will now start with the presentation of the information demand given its central role in this model. Then we will proceed to solve the model backward.

4. Private decisions and the demand for information

Private decisions are of two types: the choice of a commodity bundle **x** and the choice of e. As will become clear, these two choices must be analyzed separately, as the choice of e requires defining a notion of the value of information and this, in turn, can be defined only with respect to the maximum value function, when private choices have been made. Therefore, a two-step maximization process will be used. Solving the individual decision-making process backward, we start by considering e fixed and equal to $\widetilde{e}$. Then we can temporarily ignore the role of e and π.

As we noted, the public policy variable a is relevant to private decision making. Since the decision has to be made before (or simultaneously to) the election, a is unknown. The motivation for information gathering is to make better private decisions. However, since private choices depend on policies, it is convenient to start with political decisions.

A platform announcement is defined as a pair $\{a_A, a_B\}$. Every announcement will induce a partition of the whole population: let us indicate with $N_A(a_A, a_B)$ and $N_B(a_A, a_B)$ the size of the population that, if informed on the content of platforms, would vote respectively for party A and party B when $\{a_A, a_B\}$ is received.

Notice however that not all the people in $N_A(a_A, a_B)$ and $N_B(a_A, a_B)$ will be informed on the platforms. Since there are no priors on parties' location, A and B are just labels, and therefore uninformed citizens are not responsive to parties' proposals; we will interpret this non-responsiveness as abstention, by assuming that any indifferent voters simply do not vote. Actually, in our setting there is not much an uninformed voter can do apart from voting randomly or abstaining. We then indicate with $n_A(a_A, a_B)$ and $n_B(a_A, a_B)$ the size of the informed population voting for party A and party B respectively when $\{a_A, a_B\}$ is received, and with $En_A(a_A, a_B)$ and $En_B(a_A, a_B)$ their respective expected values when the size of the informed population is uncertain.

Let us indicate with $P(a_i|a_i, a_j)$ the probability that the platform of party i wins given that the platforms announced are $\{a_i, a_j\}$. Then we have

$$P(a_i|a_i, a_j) = \left\{ \begin{array}{l} 1 \text{ if } n_i(a_i, a_j) > n_j(a_i, a_j) \\ \frac{1}{2} \text{ if } n_i(a_i, a_j) = n_j(a_i, a_j) \end{array} \right\} \tag{3}$$

Information is used by our agents in the best possible way; we also assume that each citizen knows the distribution of public policy preferences $g(a)$. Therefore agents are able to infer the population partitions induced by any platform announcements. Since information is acquired to forecast future policies we have the following assumption about the expected policy:

Assumption 4

$$a^* = E(a|a_i, a_j) = \left\{ \begin{array}{c} a_i|En_i(a_i, a_j) > En_j(a_i, a_j),\ i, j = A, B \\ \frac{1}{2}a_i + \frac{1}{2}a_j\ if\ En_i(a_i, a_j) = En_j(a_i, a_j) \end{array} \right\}$$

In other words, each agent knows the population partitions induced by any pair of platform announcements, and, if informed about the platforms, can then forecast the future policy. This means that the optimal private decision $\mathbf{x}^*$ can be made contingent on $\{a_A, a_B\}$.

We will show later that the winning platform will depend on the realization of ω. For the moment let us just assume that the winning platform can be represented as a continuous function $a^*(\omega)$ (this will be proved in Lemma 1).

Focussing for the moment only on the choice of commodities (i.e. on the first component of the utility function), we have that the utility of an agent who observes the platform announcements is[14]

(4) $$U(x^*(m, a^*(\omega))|a^*(\omega))$$

whereas if platforms have not been observed utility is

(5) $$U(x^*(m)|a^*(\omega)).$$

Note also that when v is learned by each agent at the beginning of the game, the prior probability of ω can be updated by Bayes's rule to

$$p_\omega(\omega|v) = \frac{p_\omega(v|\omega)p(\omega)}{p_\omega(v, \omega)}.$$

Then we have the following definition:

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[14] From now on we drop prices, as they do not vary in our analysis.

Definition 1*The ex ante expected value of observing the platform announcement is given by the function*

$$\gamma(m|\widetilde{e}) = \int [U(x^*(m, a^*(\omega))|a^*(\omega)) - U(x^*(m)|a^*(\omega))]p_\omega(\omega|v)d\omega.$$

For each given realization of ω we will have a different ex post value of making an informed private choice. But since the actual realization of ω is ex ante unknown, the ex ante value of information must be expressed in expected terms over ω.

It is then possible to prove the following:

Proposition 1*Assume* $U(.) \in \Re_+$ *is quasi-concave and homogeneous of degree* 1 *in* $\mathbf{x}$*. Then* $\frac{\partial \gamma(.,e)}{\partial m} > 0$.

Proof. See Appendix.

Note that this result can be proved whether $a^*(\omega)$ is a continuous or a discrete function. The only reason we are working with a continuous framework is to stress the fact that each agent's probability of being pivotal is zero. However, all the results are still valid with a finite number of citizens (and therefore a discrete $a^*(\omega)$) as long as we assume that the probability of being pivotal in the election is negligible (see Appendix).

Now we are ready to turn to the effort allocation problem. Let us then remove the assumption that $e = \widetilde{e}$ and write the problem of a generic agent as:

$$\max_{e \in E} q(e) \int [U(\mathbf{x}^*(m(1-\pi e), a^*(\omega))|a^*(\omega))p_\omega(\omega|v)d\omega$$
$$+(1-q(e)) \int [U(\mathbf{x}^*(m(1-\pi e))|a^*(\omega))p_\omega(\omega|v)d\omega - ve$$

where $q(e)$ is the probability of observing platforms. Using definition 1 the problem can be re-written as

(6) $$\max_{e \in E} \int [U(\mathbf{x}^*(m(1-\pi e))|a^*(\omega))p_\omega(\omega|v)d\omega + q(e)\gamma(m, e) - ve$$

Note that, by Assumption 1, we have that

$$\begin{aligned}\mathbf{x}^*(m(1-\pi e), a^*(\omega)) &= [m(1-\pi e)]\mathbf{x}^*(a^*(\omega)) \\ \mathbf{x}^*(m(1-\pi e)) &= [m(1-\pi e)]\mathbf{x}^*\end{aligned}$$

and therefore we get

$$\begin{aligned}U(\mathbf{x}^*(m(1-\pi e), a^*(\omega))|a^*(\omega)) &= [m(1-\pi e)]V^*(\omega) \\ U(\mathbf{x}^*(m(1-\pi e))|a^*(\omega)) &= [m(1-\pi e)]\widetilde{V}(\omega)\end{aligned}$$

To simplify notation, let us also define the following quantities:

$$\begin{aligned}V^* &= \int V^*(\omega)p_\omega(\omega|v)d\omega \\ \widetilde{V} &= \int \widetilde{V}(\omega)p_\omega(\omega|v)d\omega \\ \gamma^* &= V^* - \widetilde{V}\end{aligned}$$

This means the value of information can be written as

$$\gamma(m,e) = [m(1-\pi e)]\gamma^*$$

Therefore, the maximization problem (6) can be re-written as

$$\max_{e\in E}[m(1-\pi e)]\widetilde{V} + q(e)[m(1-\pi e)]\gamma^* - ve \tag{7}$$

Solving this problem, we obtain the optimal effort function $e^*(m,v)$ (remember that agents are heterogeneous in m and v). This then gives the probability of being informed on political platforms $h(m,v|\omega) = q(e^*(m,v))$, where conditioning on ω indicates that there is one such function for each realization of ω. In particular, to link the probability of being informed to policy preferences, it is essential to understand how effort choice is dependent on the initial endowment of agents and therefore to calculate $\frac{de^*(m,v)}{dm}$.

Proposition 2*If* $Assumption1$ is satisfied *then* $\frac{de^*(m,v)}{dm} > 0$ *and* $\frac{de^*(m,v)}{dv} < 0$ *and therefore the probability of being informed on political platforms* $h(m, v|\omega)$ *is such that* $h_m^{'} > 0$ and $h_v^{'} < 0$.

Proof.: see Appendix.

Before concluding this section, let us recall that we are dealing with the private value of information; however, since the number of citizens is very large (it is actually infinite) any incentive to acquire information for political purposes (i.e. for instrumental voting) is negligible, in the sense that the probability of being a pivotal voter is zero in a continuum of agents. Therefore $h(m, v|\omega)$ fully represents the probability each citizen has of being informed on political platforms.

5. Voting decisions and political competition

In this section we analyze the political competition game and citizens' private and public decisions. We will solve the game backward, deriving agents' best responses and then the political equilibrium.

5.1 *Consequences*

As we have full committment to platforms, the policy proposed by the winning party (a^*) is implemented after the election; if the two parties get an equal share of votes then each policy is implemented with probability equal to $\frac{1}{2}$. Note that the population of voters consists of those agents who actually vote, and is therefore a subset of the entire population.

At the end of this period the realized utility for each agent will be given by

(8) $$U(\mathbf{x}^*(m, a^*)|a^*) - ve^*(m; v)$$

if informed and

(9) $$U(\mathbf{x}^*(m)|a^*) - ve^*(m; v)$$

if uninformed.

5.2 *Voting and private decisions*

Since there are only two parties, strategic voting is equivalent to sincere voting. Agents always have a weakly dominant strategy and their optimal voting strategy $i^*(m, a_A, a_B)$ has a simple representation:

$$(10)\ i^*(m,a_A,a_B)=\left\{\begin{array}{c} A \text{ if } U(x^*(a_A,a_B,m)|a_A)-U(x^*(a_A,a_B,m)|a_B)>0 \\ B \text{ if } U(x^*(a_A,a_B,m)|a_A)-U(x^*(a_A,a_B,m)|a_B)<0 \\ \text{abstain if } U(x^*(a_A,a_B,m)|a_A)-U(x^*(a_A,a_B,m)|a_B)=0 \end{array}\right\}$$

Voters who do not observe the platforms are indifferent between the two parties and therefore abstain. Notice, however, the difference between the two types of behaviour: uninformed agents cannot make their choice contingent on $\{a_A, a_B\}$ and therefore cannot be responsive to different platform announcements.

Optimal private decisions will be

$$(11) \qquad \mathbf{x}^* = argmax_{x\in X} U(\mathbf{x}|a^*)$$

for informed agents and

$$(12) \qquad \widetilde{\mathbf{x}} = argmax_{x\in X} \int U(\mathbf{x}|a^*(\omega))p(\omega|v)da$$

for the uninformed. These private decisions are made before elections[15]. Hence, when making private choices citizens do not know the election outcome, although they can form rational expectations.

5.3 *Information gathering*

At this stage we have the process described in the previous section. Agents must decide how much effort to devote to information gathering. Solving the maximization problem (7) we derive the optimal effort of each citizen $e^*(m,v)$ and then the probability of being informed on platform announcement $h(m,v|\omega)$. At the end of this period the total population will be divided into informed agents (those who observe the platforms) and uninformed. Note again that more effort only implies a higher probability of being informed.

5.4 *Platform announcement and political equilibrium*

Parties announce their platforms simultaneously.

[15] For our purposes they could also be simultaneous to elections.

Remember that at the beginning of the game they both observed the realization of the random variable ω and therefore they know

(13) $$E_{\omega}(e|m) = \int e^{*}(m, v)p(v|\omega)dv.$$

It is impossible to know ex ante who is going to be informed and who is not, because this depends on the realization of the idiosyncratic shocks and because $q(e)$ represents only a probability of getting information[16]. What the parties can do is to exploit the ex ante information on observables $(m$ and $\omega)$ and their relationship with the probability of being informed. ε is an idiosyncratic shock with no systematic relation with policy preferences, so it is irrelevant for parties' strategies[17]. Therefore, from the point of view of the parties we can consider

(14) $$h_{\omega}(m) = \int h(m, v|\omega)p(v|\omega)dv.$$

We assume parties are interested in maximizing expected plurality $P(a_i, a_j) = E[n_i(a_i, a_j) - n_j(a_i, a_j)]$. Therefore the problem of party i ($i = A, B$) is

(15) $$\max_{a_i \in A} P_i(a_i, a_j) = \int_{A_i(a_i,a_j)} h_{\omega}(z^{-1}(a))g(a)da - \int_{A_j(a_j,a_i)} h_{\omega}(z^{-1}(a))g(a)da$$

where $A(a_i, a_j)$ represents the set of citizens choosing party i, given that platforms are (a_i, a_j). A Nash equilibrium in platforms (a_i^*, a_j^*) must therefore satisfy

(16) $$P_i(a_i^*, a_j) \geq P_i(a_i^*, a_j^*) \geq P_i(a_i, a_j^*) \; i, j = A, B$$

Notice that from Assumption 2 the policy space admits a Condorcet winner[18]. When we say that a policy space admits a Condorcet winner we basically assume that everybody in the population space is capable of choosing his or her preferred option in a pairwise comparison. This is clearly not possible if some agents do not know what the available options

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[16] It should be noted that the process of information gathering is considered ex ante. In other words, if a lucky agent observes the announcement immediately he will stop putting effort into information gathering, before reaching the ex ante optimal level e^*. However, this interim process is not observable for the parties, which can look at the situation only from an ex ante perspective. Moreover, since luck does not depend on policy preferences, this consideration will be irrelevant when coming to political proposals.

[17] Moreover we assume that only ω is observed.

[18] See Gans and Smart (1996).

are. However, we can still find a Condorcet winner given that any subset of the population still satisfies Assumption 2. Given our assumptions, the Condorcet winner is the platform preferred by the voter who is median in the set of the ex post informed voters N_I. However, parties do not know the identity of informed and uninformed citizens and therefore cannot say ex ante what is the relevant set of voters. Since the population is very large and since both the preferred policy and the probability of being informed are monotonically related to income, we can find a focal point for parties' strategies. Clearly, this notion of Condorcet winner does not attach the same weight to every citizen, but takes into account the probability that citizens have of being able to choose in pairwise comparison. The relevant set of voters is ex ante an unknown set; hence the parties maximize over the expected relevant set of voters. The identity of informed and uninformed voters cannot be known ex ante, but the likelihood of being informed may be taken into account in maximizing expected votes, and this is reflected in the payoff function in the (15).

5.5 *Characterization of equilibrium*

In this section we derive some important properties of the equilibrium. An equilibrium in this game is given by a platform announcement for each party

$$a_i^*(\omega) \;\; (i \in \{A, B\}),$$

a vector of decision strategies for informed citizens

$$\{e^*(m; v),\; i^*(m, a_A, a_B),\; x^*(m, a_A, a_B)\}$$

and one for uninformed citizens

$$\{e^*(m; v),\; i^*(m),\; x^*(m)\}$$

We are interested in the political equilibria, and so we leave in the background the equilibrium in private choices, which will not affect our results.

The existence of a "weighted Condorcet winner", and therefore competition among parties to reach it, ensures that political equilibrium will have some simple and intuitive properties.

Proposition 3The unique political equilibrium is given by a^* s.t.

$$\int_{\underline{a}}^{a^*} h_\omega(z^{-1}(a))g(a)da = \int_{a^*}^{\overline{a}} h_\omega(z^{-1}(a))g(a)da.$$

Proof. See Appendix

Hence, parties will converge on the platform preferred by the expected median informed voter. The argument for this convergence is identical to the standard Downsian one, the only difference being that the relevant population distribution is weighted by the probability of each citizen of being reactive to political proposals.

Given the continuity of the policy space and of the distribution function of the cost of information, we can also prove the following result, which was used (but not proved) in the previous section.

Lemma 1*The political equilibrium of this game can be expressed as a continuous function* $a^*(\omega) : S_\omega \rightarrow A.$

Proof. See Appendix.

We can now turn back to the issue of the value of information. In Proposition 1 we proved that the value of political information is increasing in each agent's income; in Lemma 2 we show that the value of information is positive, even if agents are able to understand they are in a political equilibrium: rational expectations rule out all policies that cannot be sustained in equilibrium, whatever the realization of random variables, but agents are still uncertain about which equilibrium they are in.

Lemma 2*In equilibrium the value of information on platforms is positive.*

Proof. Since the distribution $h_\omega(z^{-1}(a))$ depends on the realized value of ω, voters, who have rational expectations but do not know $\omega,$ will expect to have in equilibrium $a^*(\omega).$ Anyway, informed voters can fully deduce a^* from platform convergence. Uninformed voters rationally rule out any other possibility apart from $a^*(\omega)$ but are still uncertain about the actual a^* . This fact gives a positive value to information about parties' platforms.■

6. Implications for income redistribution

We can now turn to redistributive policies. As we noted earlier, little empirical support has been found for positive models of income redistribution that are based on the median income result: in general, redistributive policies do not appear to be very responsive to the median/mean income ratio.

It is clear that many issues are at stake in democracies and that there is no simple way to explain redistribution. However, in this section we want to ask if information on politics may give some insights even in a simple one-dimensional framework.

It is possible to characterize the equilibrium in terms of the policy outcome in a precise way and compare it with the outcome of a standard Downsian model with perfect information.

Proposition 4*Let us indicate with* a_M^* *the political equilibrium when the entire population is informed on platform announcements. Then*

$$\omega \geq 0 \Rightarrow a^*(\omega) \leq a^*(0) < a_M^*.$$

Moreover, $\frac{\partial^2 h(.,.)}{\partial \omega \partial a} < 0 \Rightarrow a_\omega^{*'} < 0.$

Proof. See Appendix.

Political equilibrium in our game involves a public policy that will be, in general, different from that preferred by the median voter over the entire population. The weight attached to agents by political parties is increasing in their income, and therefore the pivotal voter has an income higher than the median. As long as acquiring information has a cost, the public policy will be bounded above by $a^*(0)$, which is lower than the median voter outcome. This provides a microfoundation for the idea that richer agents somehow have more power in the political process. This is an idea that has been recurrent in political economy but that has never been explained or founded in a rigorous way[19].

Abusing of this result and interpreting non-responsiveness to policies as abstention in general elections, we can link this idea to the stylized facts that abstention is more common among low income agents and that countries with higher turnout tend to have higher levels of

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[19] See for example Benabou (1996).

social expenditure[20]. A number of papers have linked information to participation. In decision-theory terms, being better informed allows better choices and therefore should increase the probability of voting (see Matsusaka, 1995). When strategic interactions are considered, less informed citizens might abstain in order to increase the probability of the better informed being pivotal (see Feddersen and Pesendorfer, 1996). This, however, is only true if citizens' preferences are not too heterogeneous (see Caillaud and Tirole, 1997). In terms of our model, if we introduce a cost of voting that is independent of policy preferences, then we can easily link our results on rational ignorance to actual voter turnout. This would deliver observable conclusions about electoral participation and social spending. Interestingly, Lindert (1996) finds evidence of this: "a stronger voter turnout seems to have raised spending on every kind of social program, as one would expect if one assumed that the social programs cater to the lower income groups whose voter turnout differs most over time and across countries".

Another important conclusion of the analysis of redistributive policies in political economy is that an increase in income inequality (measured as the ratio between the mean and the median income) should lead to more redistribution. In comparing two income distributions f_1 and f_2 with the same mean, a way to say that f_2 induces more redistribution than f_1 is

(17) $$\int_{\underline{m}}^{m_1} f_2(m)dm > \frac{1}{2}$$

where m_1 is the income of the pivotal voter under distribution f_1. The reason that the change produces more redistribution is that the pivotal voter under f_2 is poorer (being $m_1 > m_2$, with m_2 s.t. $\int_{\underline{m}}^{m_2} f_2(m)dm = \frac{1}{2}$) and therefore his or her distance from the mean has increased.

In our model, however, the condition for more redistribution translates into

(18) $$\int_{\underline{m}}^{m_1} h(m)f_2(m)dm > \frac{\int_{\underline{m}}^{\overline{m}} h(m)f_2(m)dm}{2}$$

It is clear that condition (17) does not imply condition (18) or viceversa. In general, the foregoing analysis leads to a result of indeterminacy: a mean-median ratio increase does not necessarily lead to more redistribution in a democratic system, as this will have two contrasting effects: more inequality increases the middle classes' desire for redistribution, but it also means greater dispersion in the probability of being informed, resulting in parties

[20] See Lindert (1996).

targeting higher-income groups. Unfortunately, it is not possible to characterize the effects of an increase in inequality better, if not in obscure and not very useful ways. However, this indeterminacy should at least counsel more prudent use of voting models for comparing the redistributive outcomes of different degrees of inequality. We can summarize this negative result in the following proposition:

Proposition 5*An increase in the mean-median income ratio is neither necessary nor sufficient for more redistribution.*

New elements come to play a role in our analysis; the way we look at inequality and redistribution is substantially different from previous models. First of all the shape of the function $h(m)$ matters. Since the results are driven by the fact that $h_m^{'}$ is positive, it can be argued that traditional results are likely to be reversed when $h_m^{'}$ is large enough. That is, to be able to say anything about redistribution we must also be able to determine the impact of income on the decision to acquire information. Clearly, this may depend on many elements: a sufficiently high general level of education, for example, is an important condition for widespread access to information and certainly raises the capability to extract information from the news. In terms of our model, education can be thought to reduce the cost of acquiring information. Also, the role of the supply of information should not be underestimated: sufficiently free press and competition in the information market, for example, can increase the availability of good quality information and hence reduce the costs of information gathering.

In focussing on the formal aspects of electoral processes, the political economy literature seems to have neglected the role of factors that certainly matter for the proper functioning of democracy: democratic decisions require not only that people go to the polls but also other institutional elements, such as those that foster informed public opinion. Evidence concerning the effects of information supply on citizens' responsiveness and political participation is provided in Larcinese (2000). Sen (1981, 1984) has pointed to the role that newspapers may play in preventing famines, by increasing citizens' awareness and therefore government activity in prevention. Besley and Burgess (2001) find a positive correlation between newspaper circulation and government responsiveness to natural calamities.

Another consideration is that focussing on median and mean incomes can be highly misleading. It would be more appropriate to consider the whole income distribution, since the identity of the expected pivotal voter can be modified by changes outside the median-mean range: changes in the distribution that leave both median and mean incomes unaltered may nevertheless influence policy choices by affecting citizens' responsiveness in other parts of the distribution, thus changing the identity of the pivotal voter.

This leads to another important consideration, namely that not only relative but also absolute inequality matters. Two distributions with the same degree of relative inequality (as gauged for example by Lorenz curves) may produce different political outcomes, because the function $h(m)$ is not necessarily linear, and will therefore "weight" the two distributive profiles differently. In section 3 we derived results on $h_m^{'}(m),$ but nothing general can be said about $h_m^{''}(m)$. That is, a change in the difference between mean and median income, leaving their ratio unaffected, would change the political equilibrium in our model even when it would not affect a standard Downsian model.

Furthermore the mean-median ratio (or distance) is not necessarily a good measure of inequality[21]. Indeed, we can think of an increase in inequality (in terms of Lorenz dominance, for example) associated with a reduction of the distance between mean and median income. However, as political equilibria have been derived in the literature in terms of this measure, it has become standard to consider only mean and median income. Yet our analysis suggests the need to considering the entire distribution. Further analysis is necessary to derive results in this direction.

Since Proposition 5 is essentially a negative result, we now use two examples to illustrate the possible implications of the foregoing analysis.

Example 1 (A poor majority).

Let us consider a population divided into two groups, P and R, with respective income m_P and m_R and $m_R > m_P$; we also assume that $N_P > N_R$. The two sources of information cost ω and ε now assume a finite number of possible values; in particular $S_w = \{\omega_L, \omega_H\}$ (with $\omega_L < \omega_H$) and $S_\varepsilon = \{\varepsilon_L, \varepsilon_M, \varepsilon_H\}$ with ($\varepsilon_L < \varepsilon_M < \varepsilon_H$) and the respective probabilities are $p_H, p_L = 1 - p_H, q_H, q_M, q_L$. We then have the following possible realizations for the cost

[21] For example it does not satisfy the Pigou-Dalton transfer principle. See Lambert (1995).

of information v :

$$v = \left\{ \begin{array}{c} v_H = \omega_H + \varepsilon_H \text{ w.p. } p_H \times q_H \\ v_{MH} = \omega_H + \varepsilon_M = \omega_L + \varepsilon_H \text{ w.p. } p_H \times q_M + q_H \times (1 - p_H) \\ v_{ML} = \omega_H + \varepsilon_L = \omega_L + \varepsilon_M \text{ w.p. } p_H \times q_L + q_M \times (1 - p_H) \\ v_L = \omega_L + \varepsilon_L \text{ w.p. } (1 - p_H) q_L \end{array} \right\}$$

Moreover, the probability of being informed assumes an extreme form:

$$q(e) = \left\{ \begin{array}{c} 1 \text{ if } e > \overline{e} \\ 0 \text{ if } e < \overline{e} \end{array} \right\}$$

We will also assume that the value of information and the income distribution are such that at a cost v_H nobody is informed, at a cost v_{MH} only the rich buy information, i.e.

$$\begin{aligned} e^*(m_R, v_{MH}) &= \overline{e} \\ e^*(m_P, v_{MH}) &= 0 \end{aligned}$$

and at cost v_{ML} and v_L all agents value information on political party platforms at more than the cost of acquiring it, i.e.

$$e^*(m_P, v_{ML}) = \overline{e}$$

It is immediately clear that with full information the Condorcet winner is the policy preferred by the poor $a^* = a_P$. Let us now analize imperfect information. Using Bayes's rule, after observing his or her own private cost, each agent is able to deduce that

$$\begin{aligned} \Pr(\omega_H | v_H) &= 1 \\ \Pr(\omega_H | v_{MH}) &= \overline{p} = \frac{p_H \times q_M}{p_H \times q_M + q_H \times (1 - p_H)} \\ \Pr(\omega_H | v_{ML}) &= \underline{p} = \frac{p_H \times q_L}{p_H \times q_L) + q_M \times (1 - p_H)} \\ \Pr(\omega_H | v_L) &= 0 \end{aligned}$$

Let us then consider the two possible realizations of ω.

Case 1: $\omega = \omega_H$. Some agents will have a private cost v_H and will have no incentive to gather information. The rich with costs v_{MH} and v_{ML} will gather information. For a large population, each agent's probability of being informed can be translated into the fraction of the population that is informed. Therefore we have $(q_M + q_L)N_R$ informed. In the same way we have $q_L N_P$ informed. If $(q_M + q_L)N_R > q_L N_P$ then $a^* = a_R$.

Case 2: $\omega = \omega_L$. The poor with $v = v_{MH}$ stay uninformed while those with $v = v_{ML}$ have a value of information greater than its cost and therefore acquire it. The rich with v_{MH} and v_{ML} will acquire information. Let us now assume that $N_R < q_M N_P$. What happens to agents with cost v_L? Notice that those agents would receive a positive value from acquiring information on party platforms. However, they also have degenerate beliefs on the realization of ω. Knowing that $\omega = \omega_L$ they learn that a fraction q_M of the poor are informed, and that is enough to establish that $a^* = a_P$. Therefore they do not need to gather information to be informed on the policy, independently of their income, and can free ride on the group with higher cost $v = v_{ML}$. Only a fraction q_M of the poor and $(q_M + q_H)$ of the rich will be informed, which ensures $a^* = a_P$. Thus, we have proved the following proposition:

Proposition 6Assume $q_M N_P > N_R$ and $(q_M + q_L)N_R > q_L N_P$. Then $a^* = a_R$ w.p. p_H and $a^* = a_P$ w.p. $(1 - p_H)$.

It is thus clear that, depending on the parameters, even a small minority of rich people may be able to obtain their preferred policy. This is likely to happen when the majority of the poor are not in a position to make relevant private decisions. If, for example, a majority of the population is at a subsistence level of income, they have no incentive to be informed on public policies, thus leaving public decisions to the rich minority, in spite of the fact that collective decisions could significantly affect their welfare. When we compare this with the outcome under full information, it is evident that the probability of having outcome $a^* = a_P$ has been reduced from 1 to $(1 - p_H)$.

Example 2 (Constitutional restriction). Let us consider again a population divided into rich and poor, with the same assumptions on population distribution and the cost of information as in Example 1. We will now also see that other sources of uncertainty can be introduced and that something can be learned about them from parties' behaviour. Also, initial endowment does not need to be income.

Agents have identical utility functions $U(c, l, g)$, where c is consumption, l is leisure and g is a public good. Gross income and net income are respectively generated by agent i

according to

$$\begin{aligned} m_i &= w_i(1-l) \\ c_i &= m_i(1-t) \end{aligned}$$

where w_i is the wage rate, $(1-l)$ is labour supply (with total time normalized to 1) and t is a flat tax rate. The public good is produced with constant returns at unitary cost and, assuming balanced budget, we have

$$g = t\sum m_i$$

Rich and poor are endowed with different wage rates $w_P < w_R$. That of the rich is assumed given and common knowledge, while that of the poor is a random variable that can assume two possible realizations: $w_P = \underline{w}_P$ w.p. p_w and $w_P = \overline{w}_P$ w.p. $(1-p_w)$ with $\overline{w}_P > \underline{w}_P$. Notice that nothing would change if instead of uncertainty on the wage rate we considered any element of preferences, say intensity of preference for the public good by either of the two groups.

We consider two possible regimes: in regime *a* a linear tax is levied on the entire population and the revenue is used to produce the public good. In regime *b* a constitutional restriction prevents taxation below a threshold level of gross income $\overline{m}$, so that if the poor have wage rate $\underline{w}_P$ they are not taxed, whatever the tax rate. Indicating this threshold with $\overline{m}$, we have

$$\begin{aligned} m_R(w_R,t) &> \overline{m} > m_P(t,\underline{w}_P) \\ \text{and } m_P(t,\overline{w}_P) &> \overline{m}\ \forall t \end{aligned}$$

Note that the public policy issue t is unidimensional, since there is a binary correspondence between t and g.

Case a: with full information t is known to everybody. Therefore each agent will perform an individual optimization over labour supply, taking into account his or her own wage rate and the tax. The indirect utility function after this process is given by $V(w(1-t),g)$. Since preferences are assumed identical for all agents, when coming to the public policy issue we will typically have $t_P > t_R$ (and $g_P > g_R$). Therefore the Condorcet winner is represented by $t^* = t_P$, and competing political parties will converge on t^*. Let us now consider the case of imperfect information. This is very similar to that analysed in the previous example. Therefore, on the basis of Proposition 6, if we did not have uncertainty on the wage rate we could have concluded that $t^* = t_R$ w.p. p_H and $t^* = t_P$ w.p. $(1 - p_H)$. But now we have to take into account that the optimal tax rate for each agent depends on the realization of the uncertain wage rate of the poor. We will have

$$t_P(\underline{w}_P) > t_P(\overline{w}_P) > t_R(\overline{w}_P) > t_R(\underline{w}_P)$$

Therefore:

$$t^* = \left\{ \begin{array}{c} t_R(\underline{w}_P) \text{ w.p. } p_H \times p_w \\ t_R(\overline{w}_P) \text{ w.p. } p_H \times (1 - p_w) \\ t_P(\overline{w}_P) \text{ w.p. } (1 - p_H) \times (1 - p_w) \\ t_P(\underline{w}_P) \text{ w.p. } (1 - p_H) \times p_w \end{array} \right\}$$

Note that the value of information for each rich agent is represented by

$$\begin{aligned} G(w_R) &= V(w_R(1 - t^*), g^*) - [\, p_H \times p_w V(w_R(1 - t_R(\underline{w}_P)), g_R(\underline{w}_P)) \\ &\quad + p_H \times (1 - p_w) V(w_R(1 - t_R(\overline{w}_P)), g_R(\overline{w}_P)) \\ &\quad + (1 - p_H) p_w V(w_R(1 - t_P(\underline{w}_P)), g_P(\underline{w}_P)) \\ &\quad + (1 - p_H)(1 - p_w) V(w_R(1 - t_P(\overline{w}_P)), g_P(\overline{w}_P))] \end{aligned}$$

The poor learn the realization of their own wage rate and therefore have one less source of uncertainty. Then the value of information for each poor agent is given by

$$\begin{aligned} G(w_P) &= V(w_P(1 - t^*), g^*) - [\, p_H V(w_P(1 - t_R(w_P)), g_R(w_P)) \\ &\quad + (1 - p_H) V(w_P(1 - t_P(w_P)), g_P(w_P)) \end{aligned}$$

We are making the following assumption on the value of information:

$$\begin{aligned} v_H &> G(w_R) > v_{MH} > v_{ML} > v_L \\ v_H &> v_{MH} > G(w_P) > v_{ML} > v_L \end{aligned}$$

Note also that the value of information for the rich in this case is not limited to knowledge of policies but extends to knowledge of an exogenous element (the wage rate of the poor) that can be useful for some decisions and that is revealed by politicians' behaviour.

Case b. Now we have a constitutional restriction that prevents the poor from being taxed if they are endowed with the low income. The preferred tax levels will change accordingly. Indicating with $t_P^C(\underline{w}_P)$ the tax rate preferred by group P when their wage rate is low, under the constitutional restriction we have $t_P^C(\underline{w}_P) = 1 > t_P(\underline{w}_P)$. If the wage rate of the poor is high then their preferred tax rate is not affected by the constitutional restriction, so $t_P^C(\overline{w}_P) = t_P(\overline{w}_P)$.

The preferred tax rate of the rich also changes. If the poor's wage is high then again the constitutional restriction has no effect: $t_R^C(\overline{w}_P) = t_R(\overline{w}_P)$. But if $w_P = \underline{w}_P$ then $t_R^C(\underline{w}_P) < t_R(\underline{w}_P)$ (assuming that the substitution effect dominates the income effect).

With full information the constitutional restriction is clearly favorable to the poor since the new Condorcet winner will simply follow the preferences of the poor. Therefore the equilibrium policy becomes $t^* = 1$ w.p. p_w and remains $t_P(\overline{w}_P)$ w.p. $(1 - p_w)$. When introducing imperfect information, notice that under the constitutional restriction if the wage rate realized for the poor is low, then they have no uncertainty over their own tax rate, which is going to be zero independently of public choice. The poor can then perform their preferred labour supply choice without information gathering: the value of information for them becomes zero and therefore lower than the lowest possible realization for the cost of information. If this is the case then the Condorcet winner is represented by $t_R^C(\underline{w}_P)$. However, if the realization of the wage rate is high then the poor will still gather information and therefore the Condorcet winner is $t_P^C(\overline{w}_P) = t_P(\overline{w}_P)$, i.e. exactly the tax rate that would prevail without constitutional restriction. As a consequence, the political equilibrium is $t_R^C(\underline{w}_P)$ w.p. p_w and $t_P(\overline{w}_P)$ w.p. $(1 - p_w)$.

The situation considering asymmetric information has been reversed. Now we can have, with probability p_w, a deviation from $t_P(\overline{w}_P)$; not, however, towards an increased tax but a reduced one. Moreover, it is even possible that the constitutional restriction is harmful for the poor. Without the constitutional restriction the (ex ante) expected tax rate is

$$E(t^*) \;\; = \;\; t_R(\underline{w}_P)\, p_H \times p_w + t_R(\overline{w}_P)\, p_H \times (1 - p_w)$$

$$+t_P(\overline{w}_P)(1-p_H)\times(1-p_w)+t_P(\underline{w}_P)(1-p_H)\times p_w$$

while under the constitutional restriction we have

$$E^C(t^*)=t_R^C(\underline{w}_P)p_w+t_P(\overline{w}_P)(1-p_w).$$

We can easily have situations where $E(t^*) > E^C(t^*)$, (for example because $t_R^C(\underline{w}_P)$ is very low) and therefore a restriction which has been introduced in order to increase income redistribution might eventually reduce it.

It is clear that a restriction on targeted benefits instead of on the tax would have delivered the same result. The basic insight is that to participate in public life people may need some "selective incentives", and an important aspect of public policies is whether or not they generate such incentives.

7. Extensions on coalitions and opinion leaders

The solution concept used in the model is Nash equilibrium: nobody wants to deviate unilaterally from his or her best response given the behaviour of other agents. It is well known that Nash equilibria do not need to be efficient, in the sense that Pareto improvements are sometimes possible when agents are able to coordinate.

It should first be noted that in the model presented here this is not the case. If side payments among citizens are not possible, then any agent would just prefer his or her ideal level of a to any other. Therefore, once an equilibrium (whatever it may be) has been reached, there is no way to improve the condition of one of the citizens without putting somebody else in a worse situation. This is a typical feature of all Downsian models[22].

It is useful to think of a as a public policy grounded in a second best environment. This creates the possibility that some public policy choices are more efficient than others, in the sense that they could Pareto dominate different outcomes if some form of compensation were possible. Anyway, since we limit our policy space to one dimension (a), then the conclusion

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[22] This is discussed in Besley and Coate (1998).

must be that any outcome of the political process is Pareto efficient. However, it is interesting to note that the political outcome is not preferred by the majority of the population, i.e. there are available alternatives that could potentially beat in pairwise comparison that selected.

Some progress could be made by recognizing that the political equilibrium of this game does not need to be coalition-proof. Nash equilibrium is concerned with the behaviour of single agents. We know that since the probability of being a pivotal voter is zero, nobody will put more effort into information gathering than what is optimal from a private perspective. However, if a large group of citizens with similar preferences can coordinate on acquiring more information, this would shift the political equilibrium towards their preferred one. This shift in political outcome could be worth the extra-effort spent in information gathering; the problem is that information above the private needs is a public good, and individuals will fail to coordinate without some specific coordinating device.

However, in a world in which it is individually costly to gather information on political platforms, it can also be too costly to coordinate people for acquiring information: moreover, there may be other reasons why people might not be willing to coordinate on information acquisition[23]. The form of coordination one can imagine is directed to reducing the costs for some groups: this is typically done by many organizations with an interest in policy choices. Another way this coordination can, at least partially, take place, is by transmitting "cheap" information. In other words, it might not be necessary to know and perfectly understand the public budget and its implications in order to make a "good" choice. If a pre-election stage is added to our model, in which people can simply endorse parties and say "vote for B" or "vote for A", without any justification, this could change the political outcome, as long as the announcements come from people whose preferences are known. We can think that a cheap message (one that can be received at low cost), rather uninformative *per se*, can nevertheless serve uninformed citizens as a good signal of where the preferred policy lies[24]. The problem in this case is transferred to the "reliability" of the sources of such messages. Is it realistic to assume that people know the political preferences of other agents? It should be recognized that some agents are able to signal their preferences in some way and that many organizations are also able to establish a reputation in this sense. Trade unions, for example, are often

[23] For example because it can seriously limit individual liberties.

[24] See for example Grossman and Helpman (1997).

able to coordinate people's voting decisions because of their reputation. Note, however, that the role of those organizations or opinion leaders is not necessarily to transmit information, which could well mantain the same cost, but to convey messages that can coordinate people's actions: we can think of this as a possible direction for investigating the role of ideologies and leadership in the political process.

The fact that this coordination failure can be more pronounced among low-income citizens is consistent with good many stylized facts about voters' turnout in elections, participation in organizations, etc. Moreover, it may tell us something about the role of political organizations in democracies, and in particular about the historical differences in the way popular parties were organized compared with traditional liberal parties (i.e. parties that were formed before universal suffrage). Our analysis may provide a rationale for the strong organization and sense of the leadership typical of most popular parties: this is simply consistent with the necessity for more effective coordination.

8. Summary and conclusion

This paper studies the role of citizens' demand for political information in elections and provides a possible explanation for the low empirical support encountered by political economy models of income redistribution. This is done by linking the demand for political information to voters' responsiveness to political platforms and considering that incentives to gather political information may derive from its relevance for private choices. This incentive is generally asymmetric across the population, which may generate a heterogeneous degree of awareness about policies. We consider a Downsian environment with vote-seeking parties and the possibility of full committment to proposed platforms and show that, for a wide class of utility functions, the ex ante value of political information is increasing in income and therefore, in electoral periods, richer agents have higher probability of being informed on proposed platforms. Since parties tend to target the citizens who are expected to be more responsive to their proposed platforms, the political equilibrium involves policy convergence not to the median preferred policy but to the policy preferred by the expected median informed voter. Therefore redistribution can be expected to be, in general, less than that predicted by the median voter result. Moreover, an increase in inequality will have two contrasting effects: it will increase the desire of agents with income below the average for redistribution, but it will also generate greater dispersion in the probability of being informed, resulting in parties targeting higher-income voters. The net effect depends on many variables and cannot be determined in a simple way, as in traditional Downsian models. This is a possible explanation for the fact that greater inequality in democratic countries does not very often lead to more social spending or redistributive taxation.

Another consequence of our analysis is that to understand redistribution we should not confine our attention to relative inequality; if a large majority of the population have only a subsistence income cannot be expected to obtain their preferred policies. At the same time, some restrictions on the policy space that are apparently beneficial for the poorest segments of the population may end up reducing their incentives to participate in public life and therefore actually working against redistribution. Those perverse effects cannot be captured in models that assume perfect information.

This analysis calls for a better understanding of mechanisms and institutions that, though not being part of a formal definition of democracy, are nevertheless quite important for its functioning. If informed choices are generally better than uninformed ones, then having an informed public opinion is an important characteristic of a truly democratic system. This consideration seems to have been neglected in most of the public choice literature to date. What is done here is clearly only a partial step, and further investigation is necessary.

From a theoretical point of view this approach can be extended to different and more sophisticated models of political competition, where the effect of multidimensional policy spaces and non-commitment on platforms can be examined taking the role of information into account. Also, the link between lack of information and abstention deserves further investigation. Some recent works establish this link in a clearly microfounded way but always assuming fixed political alternatives and therefore focussing only on voters' decision-making; il would clearly be interesting to consider the reactions of political parties, as in the present paper.

Further empirical investigation is also necessary for a better understanding of these processes, especially regarding parties' reactions to citizens' responsiveness.

Proofs of results

Proposition 1(if $a^*(\omega)$ is a continuous function).

We divide the proof in 3 steps.

1) Let us consider the objective function $\int_{\underline{\omega}}^{\overline{\omega}}\{U(x|a^*(\omega))p_\omega(\omega|v)d\omega$. Note that $U(.)$ is a continuous function and never changes its sign, and $a^*(\omega)$ and $p_\omega(\omega|v)d\omega$ are both continuous functions. Then we can apply the weighted mean value theorem for integrals to say that $\exists\ \widehat{\omega}$ s.t.

$$\int_{\underline{\omega}}^{\overline{\omega}} U(x|a^*(\omega))p_\omega(\omega|v)d\omega = U(x|a^*(\widehat{\omega}))\int_{\underline{\omega}}^{\overline{\omega}} p_\omega(\omega|v)d\omega = U(x|a^*(\widehat{\omega}))$$

We do not know the actual value of $\widehat{\omega}$, which depends on the inequality aversion of the agent, and on σ_ω^2. But we know that the optimal decision function derived under uncertainty is the same as that derived under one of the possible deterministic functions. Then we can express the solution to the utility maximization problem as $\mathbf{x}^*(m,p,a^*(\widehat{\omega}))$.

2) Note that for a homogeneous of degree 1 utility function we have $\mathbf{x}^*(m,p) = m\mathbf{x}^*(p)$ and therefore, $V(m,p,a^*) = mV(p,a^*)$. Let us define by $\widetilde{V}(m,p,a^*)$ the maximum utility attainable when platforms are not observed. Suppose we have a given realization $a^*(\omega^{'})$. The indirect utility function (ex post, i.e. if a^* is observed) is thus $V(m,p,a^*(\omega^{'}))$. From step 1, we can express the solution when a^* is not observed as $\mathbf{x}^*(m,p,a^*(\omega^{''}))$ for some $\omega^{''}\in S_\omega$. Then the ex post value of information for the realization $\omega^{'}$ is given by:

$$\begin{aligned} G(m|\omega^{'}) &= U(x^*(m,a_A,a_B)|a^*(\omega^{'})) - U(x^*(m)|a^*(\omega^{''})) \\ &= m[V(p,a^*(\omega^{'})) - V(p,a^*(\omega^{''}))] \end{aligned}$$

Note that

$$\Upsilon(\omega^{'}) = [V(p,a^*(\omega^{'})) - V(p,a^*(\omega^{''}))] \geq 0$$

with strict inequality if $\omega^{'} \neq \omega^{''}$ (by the definition of value function), which implies that $\frac{\partial G(m)}{\partial m} > 0$.

3) Finally

$$\gamma(m|e) = \int G(m|\omega)p_\omega(\omega|v)d\omega$$

and

$$\frac{\partial \gamma(m)}{\partial m} = \int \frac{\partial G(m|\omega)}{\partial m} p_{\omega}(\omega|v) d\omega.$$

The stated proposition follows from the fact that $\frac{\partial G(m)}{\partial m} > 0$.■

Proposition 1(if $a^*(\omega)$ is a discrete function)

As claimed in section 4, theorem 1 does not actually require the continuity of $a^*(\omega)$. Let us then assume a finite but very large number of citizens N and the functions $p_\omega(\omega)$ and $p_\varepsilon(\varepsilon)$ as discrete probability functions with mass respectively over $S_\omega = \{\omega_i | p_\omega(\omega_i) > 0\}$ $i = 1, ...k$, and $S_\varepsilon = \{\varepsilon_l | p_\varepsilon(\varepsilon_l) > 0\}$, $l = 1, ..., h$. Then, maintaining all other assumptions holding, we can provide the following alternative proof.

Note that step 2 in the previous proof still applies with (indicating with $\widehat{\omega}_j$ the true realization of ω)

$$G(m|\widehat{\omega}_j) = U(x^*(m, a_A, a_B)|a^*(\widehat{\omega}_j)) - \sum_{i=1}^{k} p(\omega_i) U(x^*(m)|a^*(\omega_i))$$

By homogeneity of $U(.)$, we derive (as in step 2) that

$$m[V(p, a^*(\widehat{\omega}_j)) - \sum_{i=1}^{k} p(\omega_i) V(p, a^*(\omega_i))]$$

This can be rewritten as

$$m[\sum_{i=1}^{k} p(\omega_i)[V(p, a^*(\widehat{\omega}_j)) - V(p, a^*(\omega_i))]$$

By the definition of maximum value function we have $V(p, a^*(\widehat{\omega}_j)) - V(p, a^*(\omega_i)) \geq 0$ $\forall i$, which implies $G(m|\widehat{\omega}_j) = \Upsilon(\widehat{\omega}_j)m$, where $\Upsilon(\widehat{\omega}_j) = [\sum_{i=1}^{k} p(\omega_i)[V(p, a^*(\widehat{\omega}_j)) - V(p, a^*(\omega_i))] \geq 0$.

Then we have

$$\gamma(m|e) = \sum_{i=1}^{k} p(\omega_i) \Upsilon(\omega_i) m$$

from which the result is proved immediately■.

Proposition 2The objective function is

$$\max_{e\in E}[m(1-\pi e)]\widetilde{V}+q(e)[m(1-\pi e)]\gamma^{*}-ve$$

The first order condition is

$$-\pi m\widetilde{V}+[q_{e}^{'}(e)m(1-\pi e)-q(e)\pi m)]\gamma^{*}-v=0$$

Note that the second order condition is always satisfied:

$$[q_{e}^{''}(e)m(1-\pi e)-2q_{e}^{'}(e)m\pi]\gamma^{*}<0\quad\forall e$$

We can then apply the implicit function theorem to the FOC to say that

$$\frac{\partial e^{*}(m,v)}{\partial m}=-\frac{-\pi\widetilde{V}+[q_{e}^{'}(e^{*})(1-\pi e^{*})-q(e^{*})\pi)]\gamma^{*}}{[q_{e}^{''}(e^{*})m(1-\pi e^{*})-2q_{e}^{'}(e^{*})m\pi]\gamma^{*}}$$

As we have seen, the denominator is always negative, so $\frac{\partial e^{*}(m,v)}{\partial m}>0$ if and only if

$$-\pi\widetilde{V}+q_{e}^{'}(e^{*})[(1-\pi e^{*})-q(e^{*})\pi)]\gamma^{*}>0$$

which implies

$$e^{*}<\frac{q_{e}^{'}(e^{*})\gamma-\pi\widetilde{V}-q(e^{*})\pi\gamma^{*}}{q_{e}^{'}(e^{*})\gamma^{*}\pi}\qquad\text{(A.1)}$$

However, notice that to satisfy the FOC it must be that

$$e^{*}=\frac{q_{e}^{'}(e^{*})\gamma-\pi\widetilde{V}-q(e^{*})\pi\gamma^{*}}{q_{e}^{'}(e^{*})\gamma^{*}\pi}-\frac{v}{\pi\gamma^{*}q_{e}^{'}(e^{*})m}$$

which means that A.1 is always satisfied. Therefore $\frac{\partial e^{*}(m,v)}{\partial m}>0$ and $\frac{\partial h(m,v|\omega)}{\partial m}>0.$

By using the implicit function theorem we also have that

$$\frac{\partial e^{*}(m,v)}{\partial v}=-\frac{-1}{[q_{e}^{''}(e^{*})m(1-\pi e^{*})-2q_{e}^{'}(e^{*})m\pi]\gamma^{*}}<0\ \forall e$$

which in turn implies that $\frac{\partial h(m,v|\omega)}{\partial v} < 0$ ■.

Proposition 3By assumption 2 we know that for any platform pair (a_i, a_j) there exists one type of agent $\widehat{a}$ who is indifferent between the two and either

$$a_k < \widehat{a} \Rightarrow V(m_k, a_i) > V(m_k, a_j) \forall a_k < \widehat{a}$$

or

$$a_k < \widehat{a} \Rightarrow V(m_k, a_i) < V(m_k, a_j) \forall a_k < \widehat{a}$$

Define $L(a^{'}) = \int_{\underline{a}}^{a^{'}} h_\omega(z^{-1}(a))g(a)da$ and $R(a^{'}) = \int_{a^{'}}^{\overline{a}} h_\omega(z^{-1}(a))g(a)da$. Now consider $a^{'} < a^*$. If party i chooses $a^{'}$ then party j will maximize $\pi_j(.,.)$ by setting $a^{''} = a^{'} + \iota$, for an infinitesimal ι and getting votes $R(a^{''})$. But then $a^{'}$ is not a best response to $a^{''}$ since, by continuity of the policy space, there exist $a^{''} + \iota$ that maximizes $P_i(.,.)$. But this is true for any $a^{'} < a^*$. The same argument applies for any $a^{'} > a^*$. Therefore the unique Nash equilibrium is given by (a_i^*, a_j^*) which delivers payoffs $P_j(a_i^*, a_j^*) = P_i(a_i^*, a_j^*) = 0$.■

Lemma 1Note that the distribution $h_\omega(z^{-1}(a))$ depends on the realized value of ω; therefore parties will make platform announcements contingent on ω. From platform convergence on the expected Condorcet winner we have that the equilibrium can be expressed as $a^*(\omega)$. We want to show that $a^*(\omega)$ is also a continuous function. Let us consider the implicit function

$$\triangle(\omega, a^*) = \int_{\underline{a}}^{a^*} h(z^{-1}(a)|\omega)g(a)da - \int_{a^*}^{\overline{a}} h(z^{-1}(a)|\omega)g(a)da = 0. \qquad \text{(A.2)}$$

where a^* indicates the Condorcet winner in the distribution $g(a)h(z^{-1}(a)|\omega)$. $\triangle(\omega, a_g^*)$ is clearly a continuous function (as $h_\omega(m; v)$, $p(v; \omega)$ and $g(a)$ are continuous), stricly increasing in a_g^* and

$$\lim_{a^* \to \underline{a}} \triangle(\omega, a^*) < 0$$
$$\lim_{a^* \to \overline{a}} \triangle(\omega, a^*) > 0$$

Thus, applying the global theorem for implicit functions (Dini) we can say that there exists a unique and continuous function $a^*(\omega)$ defined in S_ω and having values in A and such that $\triangle(\omega, a^*(\omega)) = 0 \; \forall \omega \in S_\omega$.■

Proposition 4In equilibrium with full information we have

$$\int_{\underline{a}}^{a_M^*} g(a)da = \int_{a_M^*}^{\overline{a}} g(a)da = \frac{1}{2}$$

while instead when $\omega > 0$ we have

$$\int_{\underline{a}}^{a_M^*} h(z^{-1}(a))g(a)da \geq \int_{a_M^*}^{\overline{a}} h(z^{-1}(a))g(a)da$$

since $h(z^{-1}(.))$ is a monotonic decreasing function. This implies a_M^* cannot be an equilibrium since $n_i(a_M^* - \varepsilon, a_M^*) \geq n_i(a_M^*, a_M^*)$. Note that instead $n_i(a_M^* + \varepsilon, a_M^*) \leq n_i(a_M^*, a_M^*)$, and therefore, by single crossing in policy preferences, deviations above a_M^* are never profitable. By the same property, any subset of N will have a Condorcet winner represented by the policy a^* preferred by the median voter in the considered subset.

Now remember that $h_\omega(m; v) = q(e^*(m; v))$. Therefore if $\omega = 0$ then $v = \varepsilon$. Thus we have $E(e|m) = \int e^*(m; \varepsilon)p(\varepsilon)d\varepsilon$. Also, $e^*(m; \varepsilon)$ and $p(\varepsilon)$ are continuous functions, which implies $E(e|m)$ is continuous. Since $m' > m \Rightarrow e^*(m'; \varepsilon) > e^*(m; \varepsilon)\ \forall \varepsilon \in S_\varepsilon$ then $\frac{\partial E(e|m)}{\partial m} > 0$ and therefore $h_0(m)$ is increasing in m which implies that $a^*(\omega)$ has an upper bound in $a^*(0)$ which is strictly lower than a_M^*.

To prove the second part of the statement, let us reconsider $\triangle(\omega, a^*)$. From the implicit function theorem we know that

$$a_\omega^{*'} = -\frac{\frac{\partial \triangle(\omega, a^*(\omega))}{\partial \omega}}{\frac{\partial \triangle(\omega, a^*(\omega))}{\partial a^*}}$$

The denominator is clearly positive, while the sign of the nominator is ambiguous. Therefore the sign of $a_\omega^{*'}$ is opposite to that of

$$\int_{\underline{a}}^{a^*(\omega)} \frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega} g(a)da - \int_{a^*(\omega)}^{\overline{a}} \frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega} g(a)da$$

First note that $\frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega} < 0$ which implies that both integrals are negative. If $\frac{\partial^2 h(.,.)}{\partial \omega \partial a} < 0$ then any value of $\frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega}$ in the first integral is higher than any value of $\frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega}$ in the second one. Since the derivative is calculated in $a^*(\omega)$ then each side has a total mass of half in terms of $g(a)$. Therefore we must have

$$\int_{\underline{a}}^{a^*(\omega)} \frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega} g(a)da > \int_{a^*(\omega)}^{\overline{a}} \frac{\partial h(z^{-1}(a)|\omega)}{\partial \omega} g(a)da$$

which implies $a_{\omega}^{*'} < 0$.■

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