Value and Politics

By

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1. History

By the last decade of the twentieth century, taxes as a percentage of GNP in the advanced democracies ranged from a figure of 27 in the United States to 56 in Sweden. These taxes are determined by voters, through the medium of competition among political parties. It has been observed for millenia that the economic interests of citizens determine, to a large extent their political behavior, and for centuries, at least, that political decisions and state policy determine aspects of the economy, including relative prices and distribution. But it was only in the early 1970s that precise models of the *interdependency* between democratic politics and economic magnitudes were first formulated.

My hypothesis is that value and politics, in modern democracies, are intimately related, where by value we can either mean the restricted concept of relative prices of commodities, or the broader concept of economic distribution. Economists, as opposed to finance theorists, are interested in relative prices in so far as they tell us important things about human welfare; the main influence of prices on welfare is through their consequences for income distribution. But of course, in non-laissez-faire economies, distribution is not determined only by relative prices, which is to say that the income of a citizen is not simply the sum of the monetary values of the endowments that she chooses to sell: there are, as well, public goods and transfer payments. So the economist must, in

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modern democracies, be interested in distribution, which is not simply a corollary to value in its restricted sense. Distribution does not consist only of the distribution of private goods to citizens, but also of the supply of public goods and bads that all consume. From this we may derive the distribution of welfare, if individuals are endowed with utility functions that permit a sufficient degree of interpersonal comparability[2].

I said that, while the recognition that economic magnitudes influence politics is age-old, the other direction – the influence of political decisions on economic magnitudes-- is perhaps only centuries old. Certainly Adam Smith was well aware of both directions. Concerning the second direction, he recognized the effects of tariffs on domestic prices and of taxes on a variety of economic and distributive magnitudes. In Chapter 2 of Book V of *The Wealth of Nations* (1994 [1784]), he recognized the incentive effects of taxation. He opposed the tithe, in which a fraction of the product of land was taken as tax, as discouraging the improvement of land. He noted that taxes on wages raise wages by more than the tax, and believed that taxes on the 'liberal professions' raised the salaries of those professions while taxes on government officers did not, because the salaries of the latter were not determined by competition. He believed that luxury goods should be taxed, but not necessaries, as taxing the latter would raise wages and therefore the cost of production, while taxing luxury goods which are not consumed by workers, would not do so.

I will not attempt to treat the nineteenth century economists in any detail, except to note that David Ricardo, famously, advocated decreasing tariffs on grain in order to

[2] Or if the ethical observer wants to apply her own interpersonally comparable measure of well-being.

keep domestic wages low, and hence keep domestic industry competitive, and Karl Marx and Friedrich Engels believed that , if the working class were to win the vote, then massive redistribution would take place. Francis Edgeworth (1958 [1897]) and Knut Wicksell (1958 [1896]) considered the problem of taxation for the financing of public goods, but from the ethical, rather than political-economic viewpoint: that is, they took the normative stance. It was Erik Lindahl (1958 [1919]), who, in 1919, first proposed a political model of the determination of the level of public goods and the incidence of their cost on the citizenry, and it is worth, I think, reviewing his model here.

Lindahl assumed that there were two homogeneous classes of citizen, denoted *A* and *B*. He also refers to *A* and *B* as 'parties,' and I believe he means by this, political parties. Suppose that a level of a public good, y , must be arrived at, where the level of the good is defined by its cost of production. In addition, the cost of production must be shared between the two parties: let x and 1-x be the shares paid by *A* and *B* respectively. Let the total utility from consuming the public good of the group *A* be denoted *f(y)* and the total utility of *B* be denoted $\varphi(y)$; Lindahl assumes that *f* and ϕ are increasing, concave, differentiable functions. He further assumes that the net welfare of each group is given by the difference of their utility from consuming the good and the cost they must bear. Thus, the utilities of the two parties at the allocation $(x,y)$are $f(y)-xy$, for *A,* and $\varphi(y)-(1-x)y$, for *B*. He notes that at any share x, party *A* would choose its desired level of the public good by setting its marginal utility equal to its cost share, which is just the first-order condition for the maximization of utility:

$$f'(y)=x, \qquad (1)$$

while party *B* would do the same, yielding:

$$\varphi'(y) = 1 - x. \qquad (2)$$

In Figure 1, I have graphed, the functions (1) and (2). Each of the equations (1) and (2) determines a curve in the (y,x) plane, and these curves intersect uniquely in a point (y*,x*). (The curve determined by (1) is denoted *RA*.) This is the allocation, Lindahl says, that 'corresponds to a situation in which both parties have equally safeguarded the economic rights to which they are entitled under the existing property order. This position can be called the standard position, in that it would be reached if power were distributed evenly in relation to the existing property order.' He also notes that the maximal total net gain to both parties is achieved at this allocation. We can verify this by substituting out for x in equations (1) and (2), yielding:

$$f'(y) + \varphi'(y) - 1 = 0, \qquad (3)$$

which is indeed the first-order condition for the maximization of $f(y) + \varphi(y) - y$, which is the aggregate net gain, or surplus, function.

But Lindahl does not suppose that (y*,x*) is necessarily the political equilibrium: he says that if one party is more powerful than it is in the standard position, then it can shift the allocation in its own favor. In fact, he proposes that the set of possible equilibria are the left-hand envelope of the curves of in Figure 1, the curve *SPR*. His reasoning was that, at any given share level x, the level of the public good would be the minimum agreed to by the two parties.

What Lindahl appears not to have noticed, but we should notice, is that there is, in fact, a unique level of the public good that is associated with all Pareto efficient allocations in his model, namely, the level that maximizes the total surplus. This follows from the fact that the utility functions of the players *A* and *B* are quasi-linear. Thus, if

politics engenders efficient allocations, then the level of the public good would be determined at that value y^* that solves equation (3), but the share variable x would be determined by political competition. Since Lindahl believed that equilibria could lie anywhere on the locus *SPR,* he therefore implicitly thought that politics does not necessarily deliver Pareto efficient allocations. Perhaps, however, had he been confronted with this observation, he would have revised his view of political competition.

It is clear, from what I have described, that Lindahl viewed the political decision as a bargaining problem between the two parties. From the political-economy viewpoint, this was an advance over the Wicksellian ethical approach, even if Lindahl did not have a theory of bargaining well worked out. Indeed, we might ask, what is the Nash bargaining solution to Lindahl's problem. It is, of course, to produce the efficient level of the public good, y^*, and the cost share variable turns out to be:

$$x = \frac{1}{2} + \frac{f(y^*) - \varphi(y^*)}{y^*}. \qquad (4)$$

In particular, this is *not* the Lindahl cost-share x^*, in general. The party pays the larger share who values the public good more, not whose *marginal* utility from the public good is greater, as in the Lindahl solution. To put it another way, at the Nash bargaining solution, given their cost-shares, each party would like a different level of the public good from y^*, so there is compromise on both sides.

The Lindahl solution for economies with public goods (see, for instance, Roberts (1974)) has come to be known as the generalization of Lindahl's equations (1) and (2), namely, a set of individualized prices that citizens pay for public goods at which they unanimously desire the same levels of those goods. As I have shown, such a set of prices does not coincide even in Lindahl's own very simple case with the outcome of the most

common bargaining solution to the problem, the Nash bargain. An alternative focal point, from which Lindahl could have been generalized, was his methodologically innovative assumption that political competition determines the value of public goods and the incidence of their cost on the citizenry: that would have led in the direction of bargaining theory.

The next model which discussed the political determination, in a sense, of economic magnitudes was Robert Goodwin's (1967) adaptation of the predator-prey model from biology to growth theory, almost fifty years after Lindahl's paper. Goodwin hypothesizes two classes, workers and capitalists: the workers determine the share of wages in total output, and the capitalists determine the share of profits that are invested, or equivalently, the share of labor that is employed in the next period. The model is concerned not with the level of a public good, but rather with distribution, but the two-party feature is similar to Lindahl. Goodwin's model is formulated as a dynamic game, and leads to cycles in unemployment and the wage share. But Goodwin's model is, in an important sense not a model of democracy. Formally, note that, each 'party' proposes only one dimension of 'policy': the workers propose an income share, and the capitalists propose how much to invest. One important aspect of democractic competition will be that both (or all) parties propose a value for every relevant policy variable.

In 1957, Anthony Downs published *An Economic Theory of Democracy*, which adapted the spatial model of Hotelling (1929) to politics. The application was path-breaking, as it marked the first formal attempt at a positive model of political competition which distinguished between parties from groups of citizens. As we have noted, in both the Lindahl and Goodwin models, parties are coextensive with homogeneous groups of

citizens. For Downs, there is an extreme divergence between parties and citizens: candidates (the political actors) are completely opportunistic in their choice of policies, which , for them, are simply instruments to maximize the probability of winning the election, while citizens (that is, voters) are concerned only with policies. Downs assumed that the policy space was unidimensional, that voters' utility functions were quasi-concave (single-peaked) on the policy space, and he showed that the unique Nash equilibrium of the game between two opportunistic candidates consisted in both of their announcing the median ideal policy of the citizenry. Hotelling, of course, did not call this a Nash equilibrium, writing, as he did, about thirty years before Nash, and neither did Downs recognize it as such.

The 'economics' in Downs was implicit, and limited to the direction ' economics influences politics', for presumably, the utility functions over policies of the citizenry could be derived from their direct utility functions over commodities and public goods. Downs, however, did not apply the model explicitly to economies. As a model of politics, it constituted an extreme divergence from Lindahl and Goodwin, in that the parties – or candidates—represented *no citizen*. Certainly the idea that political parties in democracies had elements of opportunism had a long history, going back at least to Michels (1915); but the choice to model them as caring *only* about winning office was a radical one. Moreover, it cannot be said that this view of politics was in any sense prevalent at the time that Downs wrote, for almost simultaneously, Seymour Martin Lipset (1994 [1960]) published *Political Man*, a non-formal treatise on the history of democratic parties, in which he argued that parties represent economic classes, and Carl Schorske (1955) had published, only a few years before, his influential history of the

German Social Democratic Party, in which he showed the important influence of workers' interests on party policy. Downs's model of politics seems to have come not from the political history or the political science of the time, but rather from a view that rational agents maximize their interests, and the interest of a candidate should be taken to be the winning of office.

It must be said, in Downs's defense, that the principal-agent model had not yet been formulated, and that would have provided the intermediate step between Lindahl and Downs, namely, the model of a party that acted as an imperfect agent for its collective constituency, an interest group or, more generally, a coalition, of the citizenry.

In the twenty-five years from 1945 to 1970, the key developments in economics that are relevant to our story were the coming-to-fruition of the Walrasian model, in the work of Arrow and Debreu (1954), the development of optimal tax theory, in the work of Mirrlees (1971), and the founding work of public-choice theory by Buchanan and Tullock (1962). The general equilibrium model of Arrow and Debreu was notable for its formal precision and its non-inclusion of public good and of politics, optimal taxation theory was notable for its formal precision and its normative rather than positive focus, and Buchanan and Tullock's *The Calculus of Consent* was notable for its positive rather than normative approach. The synthesis of formal methodology, public goods, and a positive approach to taxation was yet to be achieved.

I do not mention, here, the Arrow Impossibility Theorem and the advent of social choice theory, because it was neither explicitly economic, nor positive, although it was formal. The Arrow theorem postulated an abstract environment of social alternatives, and proceeded to show that certain normatively desirable properties could not

simultaneously hold for any social decision procedure. Thus, although it was said, in some quarters, to provoke a pessimistic view about the possibility of a normatively desirable democracy, Arrow's work was twice removed from political economy, rather than once removed, as were Mirrlees and Buchanan and Tullock.

The first papers to accomplish the unification of formal method and positive political-economic analysis were published in the early 1970s, by Theodore Bergstrom and R. Goodman (1973), who applied Downs's model to determine the rate of taxation to fund a public good, and by Thomas Romer (1975) and Kevin Roberts (1977), who applied the median-voter theorem to determine redistributive policy.

The equilibrium concept in Bergstrom and Goodman is incomplete, in that it assumes exogenously given tax rates which are personalized across citizens; these tax rates determine preferences over the level of a public good, which are single-peaked, and it is stated that the median-income citizen determines the level of the public good. Romer and Roberts….

[The method of these papers was in brief the following. Each citizen was presumed to have a utility function over goods, which induced an indirect utility function over a unidimensional space of tax policies, given the mapping of tax policies into distributions of commodities. This mapping was derived from computing the economic equilibrium that would attain at any given tax rate. Under the right conditions, citizens' indirect utility functions were single-peaked (i.e., quasi-concave), and hence a Downs political equilibrium existed.]

At about the same time, Donald Wittman(1973, 1983) proposed an alternative model to Downs's of equilibrium in party competition, in which parties are not

opportunistic, but maximize a utility function defined on a policy space. To be precise, parties maximize *expected* utility, because there is uncertainty concerning which party will win the election, at a given pair of policy proposals. Wittman's parties are not opportunistic, because they do not care about winning for the sake of winning, but only for the sake of implementing a policy. Thus a Wittmanesque party with an ideal policy of t would be perfectly satisfied if the opposition were elected and implemented t. Wittman's analysis, however, was incomplete in several ways: first, it did not link up the preferences of his parties to citizens' preferences, and second, it did not contain a correct proof of the existence of Nash equilibrium in the model. Nevertheless, Wittman's model was the only formal alternative to Downs's for twenty years or so, and in the 1990s would come to play a role in political economy.

2. The present

This brings us to what I shall call the present period, and before continuing, it is perhaps worthwhile to fix our vision by proposing a general model of political-economic equilibrium for an economy with private-ownership of firms and commodities.

I will not try to be as general as possible, but will introduce two generalizations of the traditional economic model that will be useful in the discussion. First, we assume that individuals have preferences over a domain consisting of goods, private and public, and *principles*. A principle is an issue on which the elected government takes a position, an issue citizens care about, but not necessarily for economic reasons. Principles can include, for example, issues of personal rights, environmental and ethical concerns, and religious positions. A vector of goods will be represented by x and a

vector of principles by *y,* where the components of *y* are the positions of the government on the various principles, which may or may not be measured by a continuous variable. We suppose there are *m* goods and *n* principles. Secondly, we assume that individuals' preferences are represented by particular utility functions, which have some measurability properties that permit aggregation. (Cardinal unit comparability will be enough in what follows.) Otherwise, the economy is standard: individuals have endowments of private goods, including ownership shares in firms, and firms have technologies which produce private and public goods from inputs owned by individual citizens.

A *type* of individual is a utility function and an endowment of goods; thus type *w* is specified by a utility function $u(\cdot;w):\mathbf{R}_+^m \times \mathbf{R}^n \to \mathbf{R}$ and an endowment of goods $\omega \in \mathbf{R}_+^m$. We have assumed that the levels of principles can take on any real number. Types are drawn from a sample space *W,* and the population is specified by a probability measure **F** on *W*.

There is a policy space denoted $\mathbf{T}= T \times \mathbf{R}^n$, where *T* is a space of vectors of 'economic policies' such as tax rates, regulations on firms, transfer payments, budgets for the production of public goods, and so on. A policy $(t,y) \in T \times \mathbf{R}^n$ consists of a vector of economic policies and a vector specifying positions on principles. We will also denote a policy by τ.

At a policy $\tau=(t,y)$ which is implemented, every citizen must 'consume' y. That is, the citizen lives in a society in which the principles *y* are publicly expressed and/or implemented. For example, a principle could specify a law on abortion, or establish an

official state church. Note that once principles *y* are given, the utility functions induce utility functions on goods alone. We are then in a standard economic environment.

An *economic equilibrium at a policy* (*t,y*) is a set of prices *p* for private goods, a distribution of private goods to citizens and a vector of public goods such that, when citizens maximize their utilities given the principles *y,* the prices *p,* the rules engendered by *t*, and the vector of public goods, all markets clear, including the markets for public goods, whose demands by the government are specified in the vector *t*.

We now assume that there is a non-empty set of policies, denoted Γ , whose elements are each associated with a unique economic equilibrium. Call Γ the set of *admissible* policies. We denote the mapping from Γ into the space of economic equilibria by *E*; it associates a policy τ with an equilibrium (*p,x)* where *p* is a price vector, and *x* is a distribution of private and public goods. The mapping *E* summarizes the direction 'policy determines economics or value', or more precisely, political variables determine prices and distribution. We call *E* an *economy,* for it specifies how policies induce a distribution of goods and welfare.

We next model the other direction, how economics determines politicies. Here, I will deliberately be much less general than one could be, for I wish to model, more specifically, democratic politics in which parties, which represent coalitions of citizens, compete with each other over policies. The datum with which we begin is a profile of utility functions defined on the policy space, one for each type: thus, a function v:$\mathbf{T}\times W \rightarrow \mathbf{R}$, where $v(t,y;w)$ is the utility that type *w* enjoys at the policy (*t,y*). I shall restrict myself, for the sake of avoiding gratuitous generality, to the case of

political equilibrium with two parties. Let the set of reflexive, transitive, binary relations on $\mathbf{T}\times\mathbf{T}$ be denoted **P** and let the generic element of **P** be denoted Π. (In the standard case, Π induces a payoff function, which we also denote by Π: $\mathbf{T}\times\mathbf{T}\rightarrow\mathbf{R}$.) Each of our two parties will be identified with a binary relation Π. A *party system at v* is (1) a partition of *W* into two elements, which we write $W = L\cup R$, and (2) a mapping σ from the set of two-element partitions of *W* into $\mathbf{P}\times\mathbf{P}$. Thus a party system is a division of the population into two parties, where each party possesses a payoff function (more generally, a binary relation which may not be complete) on $\mathbf{T}\times\mathbf{T}$. The mapping σ tells us how the membership of parties induces party preferences on policies, so it models the idea of parties representing citizens.

We can now specify a game played by the two parties, where the common strategy for both of them is the policy space **T**. Denote the binary relations of the parties associated with a partition (*L,R*) , Π^L and Π^R. A Nash equlibrium of the game $(\Pi^L,\Pi^R,\mathbf{T})$ is a pair of policies (τ^L,τ^R) such that:

there is no $\tau\in\mathbf{T}$ such that $\Pi^L(\tau^L,\tau^R) < \Pi^L(\tau,\tau^R)$, and
there is no $\tau\in\mathbf{T}$ such that $\Pi^R(\tau^L,\tau^R) < \Pi^L(\tau^L,\tau)$.

We call (τ^L,τ^R) a *Nash equilibrium of the party system* (*L,R,*σ).

Finally we define a *political equilibrium with endogenous parties at* (v,σ) as a party system (*L,R,* σ), and a Nash equilibrium for the party system (τ^L,τ^R) such that :

for all $w\in L$, $v(\tau^L,w)\geq v(\tau^R,w)$, and

for all $w\in R$, $v(\tau^R,w)\geq v(\tau^L,w)$.

In words, each party member weakly prefers the policy put forth by his own party in equilibrium to the policy put forth by the other party.

The concept of political equilibrium with endogenous parties models how the preferences of citizens induce two parties, which represent citizens, and which compete to propose policies. The party system is stable when it is the case that party members indeed are happy with their own party's policy proposal in equilibrium, in the sense that they prefer that proposal to the opposing party's proposal[3].

We have, finally, to connect up the two halves of the political economy. Thus far, we have described how policies determine distribution and how political preferences determine equilibrium policies. How do these two halves mesh?

The key is to use the mapping E to define the 'political' preferences v from the direct utility functions u. Thus, for each policy τ in Γ there is an economic equilibrium, $E(\tau)$. Let $w(E(\tau))$ be the vector of private and public goods and principles consumed by type w at this equilibrium, and define:

$$v(\tau,w) = u(w(E(\tau)),w). \qquad (4)$$

In other words, we now say that citizens' preferences over policies are determined by their direct utility functions evaluated at the allocation of economic goods and principles that the policies induce through the process of economic equilibrium.

We are now prepared to define a full political- economic equilibrium . The data are:

[3] If this were not the case, we imagine that the member in question would 'vote with his feet' and switch to the other party.

(a) a set of goods and principles, a set of types W, each defined by a utility function u on the domain of goods and principles, and an endowment of goods;

(b) a distribution of types, $\mathbf{F}$;

(c) a space of policies $\mathbf{T} = T \times \mathbf{R}^n$

(d) a mapping σ from two-element partitions of W into pairs of binary relations on $\mathbf{T} \times \mathbf{T}$.

A *political economic equilibrium* given these data is :

(e) an economy E for the data (a), (b), and (c);

(f) a function $v: \mathbf{T} \times W \rightarrow \mathbf{R}$ defined by (4);

(g) a political equilibrium (L, R, τ^L, τ^R) at (v, σ).

The primitives of the model are thus preferences over goods and principles, a distribution of types, a space of policies, and a procedure whereby groups of citizens aggregate their interests into parties, which are represented as preference orders on the cross-product of policy spaces. The output of the model is an economy, a profile of political preferences of the types (that is , induced preferences over the policy space), a pair of parties representing two exhaustive and disjoint classes of types, and a pair of policies that constitute an equilibrium in the political game between these parties.

We do not state which policy 'wins the election'; it could be the policy preferred by the majority of voters, or there might be some uncertainty, which complicates the matter. (The simplest kind of uncertainty would occur if exactly one-half the population prefers each policy, in which case a fair coin is tossed to determine the winner.) Once the winner of the election is determined, we would standardly assume that the winning

policy, call it τ^*, is implemented, which in turn determines the economic equilibrium $E(\tau^*)$. Thus, we have the full story of how economics and politics *determine each other*.

Although the concept of political-economic equilibrium, thus defined, may seem complex, I think it states the minimal research program in political economy today: the goal of political economists, I think, should be to develop interesting examples and applications of this model. Relatively speaking, we can say that we understand the mapping E very well: this is what general equilibrium theory has given us. The main challenge is to think of mappings σ which model how parties are formed, *and* for which political equilibria exist.

Let us see how 'median voter' models can be viewed as political-economic equilibria. The typical environment has a null set of principles, and a unidimensional space T of policies: thus $\mathbf{T}=T$. An individual's type, w, may be specified by her real wage, that is the amount of a single consumption good she can produce in an hour of work. Thus, there is one firm that produces one good with constant returns to scale in one input, labor, but citizens are endowed with labor in different amounts of efficiency units. The single policy is a tax policy, which taxes all income at a proportional rate, t, and returns an identical lump sum transfer, b, to each citizen. Individuals care about consumption of the good and leisure, and facing a tax rate t and a proposed transfer payment b, they optimize. A policy (t,b) is admissible if the labor supplied by the optimizing agents is just enough to produce the amount of the good that, when taxed at t, produces government revenue that just equals the total amount of transfers that citizens must receive at the promised level b. The set of pairs (t,b) that satisfy this condition

constitute the set Γ. In fact, each t determines a transfer $b(t)$ through the economy, so without loss of generality, we could just represent policies by tax rates, t.

The determination of relative prices by policies is trivial here: the real wage of a worker of type w is always w, taking the price of the consumption good as numeraire. This is due to the constant-returns technology. So, although different policies produce different distributions of the good and of welfare, they do not alter relative prices of skilled labor and the good.

For each t we have an economic equilibrium, which induces the utility function $v(t,w)$, expressing the utility that type w gets at the equilibrium induced by tax rate t.

We now define a particular binary relation on $T \times T$. At a pair of tax rates (t^1,t^2) let $f(t^1,t^2)$ be the fraction of the population that prefers t^1 to t^2. We consider the binary relation, Π^1, whose domain is $T \times T$ defined by:

$$\Pi^1(t^1,t^2) \geq \Pi^1(t^3,t^4) \Leftrightarrow f(t^1,t^2) \geq f(t^3,t^4).$$

That is, a party identified with Π^1 prefers to be in a situation where it and its opposition propose t^1 and t^2, respectively, than a situation in which it and its opposition propose t^3 and t^4, respectively, if and only if it wins a larger fraction of the vote in the first situation than in the second.

Similarly, we define the binary relation Π^2 in the opposite way:

$$\Pi^2(t^1,t^2) \geq \Pi^2(t^3,t^4) \Leftrightarrow f(t^1,t^2) \leq f(t^3,t^4).$$

Thus, a party with these preferences is viewed, also, as only caring about winning large majorities, but it is identified with playing the second policy in the ordered pair (t^1,t^2) or (t^3,t^4).

We now define a very trivial mapping $\sigma*$, which maps *every* partition of *W* into the ordered pair (Π^1,Π^2). That is, regardless of how the citizenry separates itself into two elements to form two parties, each party cares *only* about winning the election.

If the utility function *v* is single-peaked in *t*, as it will be if *u* is well-behaved, then the median voter theorem tells us there is, for *any* partition *(L,R)* a political equilibrium with endogenous parties at (v,σ^*) at which both parties propose the ideal policy of the median citizen, which will here be the citizen whose real wage is the median real wage.

This is, essentially, the structure of all political-economy models that invoke the median voter theorem. From the vantage point of the concept of political-economic equilibrium, as I have defined it, these median-voter examples are deficient in two major respects: first, political-economic equilibrium only exists if the policy space is unidimensional, and second, the mapping σ is non-responsive to the preferences of the members of the parties: it is , simply, a constant mapping. (One might add a third deficiency: that the model implies that parties always propose the same policy.) Regarding existence, the problem is that, if the policy space is multi-dimensional, then there is in general no Nash equilibrium for the game between these two victory-seeking parties. Formally, this is because there is usually no Condorcet winner in a multi-dimensional policy space. The second point is the formal consequence of adopting a conception of party competition in which parties do not have the interests of their members at heart, but are purely opportunistic.

There are now many researchers in the area of political economy, and very few models actually are special cases of the definition of political-economic equilibrium that I

have given, because different writers generalize this or that part of my definition. Many work with economies in which there is asymmetric information, or model the party competition process as consisting of two stages -- a general election, and legislative bargaining -- and/or introduce more than two parties, or introduce a many-period economy to study the interplay between growth and politics, and so on. Thus, writing the general model as I have reflects my own views about what is of primary importance in the political-economy project. I will single out two aspects, upon which I will concentrate the rest of my remarks.

The first is to produce a conception of political competition which supports the existence of equilibrium when the policy space has more than one dimension. Modeling politics as unidimensional is extremely constraining, and I would say, extremely unrealistic, yet Nash equilibrium between opportunistic parties only exists, essentially, when the policy space is unidimensional. The response of most writers to this problem has been either to substitute some other equilibrium concept than Nash's for the game played between parties, or to say that equilibrium fails to exist in political competition, and the consequence is 'cycling.' In the latter case, attention then switches to what sorts of political institution are invented to stop the cycle. I have found both of these approaches to be intellectually unappealing for reasons that I describe in Roemer (2001).

The second problem is to propose a mapping σ in which parties are responsive to their members. This is not a goal that all researchers find compelling – clearly Anthony Downs did not. But my view is that political parties are key institutions through which citizens with opposing interests organize their competition with each other, and it is an historical error to model parties as not reflecting these partisan interests in their goals.

To the contrary, some argue that parties are created to get certain individuals elected, and the example of the Reform Party in the US, which appears to have been formed by Ross Perot for this reason, may be a case in point. Nevertheless, I think for a party to be long-standing, it must become the voice of a coalition of citizens – not a totally principled voice, perhaps, but a voice, nonetheless.

Let me discuss, first, the second of these two problems. Clearly, Lindahl's model conceived of parties as representing two coalitions of citizens, but the coalitional aspect was rather trivial, because there were only two types in his society. Wittman proposed a model of parties that have preferences over policies that are not related to their popularity, but he failed to connect the parties' preferences to the preferences of voters. The first work of which I am aware that modeled political equilibrium with endogenous parties more or less as I have defined it is that of David Baron (1993). Baron defines a partition of voters, each represented by a party; parties take their preferences to be the average preferences of their members (thus, an average of the functions $v(\cdot,w)$ over the set of w belonging to the party); there is a refinement of Nash equilibrium for the equilibrium in the game in which parties compete; and finally, each citizen must weakly prefer the policy proposed by her party to all other parties' proposals, in equilibrium. Baron's model is more complex than the one I have proposed in having more than two parties, and in having two stages -- one a general election, and the second, the formation of a government; it is less complex in not modeling the economic side. Strictly speaking, then, it is a souped up version of the concept of political equilibrium I have proposed. In particular, it proposes an interesting mapping σ and an equilibrium concept that works -- even when the policy space is multi-dimensional, I should add.

The first model, I think, which is actually a special case of our general model is due to Ortu~no-Ortin and Roemer (1998), and is available in Roemer (2001, pp. 91-94). In this model, citizens must decide upon the level of funding of a public good, to be financed by a proportional tax rate. Besides the public good, there is one private consumption good, and agents do not care about leisure. Each citizen is characterized by her real wage, that determines the amount of the private good she can produce in one hour. Thus, given a tax rate, there is an induced economic equilibrium (very trivially) with a level of the public good. This induces the function $v(t,w)$. The party formation process is as in Baron, except there are just two parties. Given a partition of the citizenry into two elements L and R, each party takes as its utility function on the policy space the average of the utility functions of its members. There is some uncertainty in the model, so that, given a pair of policies, there is only a probability that each party will win. Now, as in Wittman, each party wishes to maximizes its expected utility. The binary relations Π^L and Π^R can now be defined in a natural way. It is shown that a partition of types exists such that, at the Nash equilibrium of the game between the associated parties, which exists, each member of each party prefers her party's policy to the other party's policy. Thus, political-economic equilibrium exists.

Even though this model is very simple, especially in its economic part, it leads to some interesting results that are contrary to what occurs with median-voter politics. So replacing the Downsian mapping σ^* with a party formation process that is responsive to members leads, potentially, to quite different conclusions in political economy.

I finally discuss the first aspect raised above, the issue of finding a conception of political competition which supports Nash equilibrium when the policy space is multi-

dimensional. As I have phrased the definition of political-economic equilibrium, it is actually a question of finding a mapping σ that generates payoff functions for the parties for which Nash equilibrium exists, when the strategy space for each party is the policy space. Recently I have solved this problem, by conceiving of parties as constituted of factions who bargain with each other. In particular, I propose that a party possesses three kinds of activist: opportunists, who are Downs-like characters and wish only to win the election; militants, or ideologues, who do not care about winning elections, but who want to use the party as an instrument to publicize their membership's interests; and reformists, who are Wittman-like characters, and wish to maximize the expected average utility of their party's membership. Formally, given a partition of the set of types *(L,R),* we define the binary relation of a party on $\mathbf{T} \times \mathbf{T}$ as the intersection of the binary relations induced by the preferences of its three factions. In words, this means that, for a party to change its policy, all three factions must agree to the change. This implies that a Nash equilibrium of the game between the two parties, if it exists, has the property that, for each party, given the opposition's policy proposal, there is no policy proposal that all three of its factions prefer to the one that it is proposing – and the same statement is true of the opposition. The mapping σ is defined by taking the 'utility function' of the party as the average of functions $v(\cdot,w)$ of its members, and then defining the binary relations as I have described[4].

The important fact is that, for a wide variety of economic specifications, there exist political-economic equilibria, regardless of the dimension of the policy space. I

[4] It turns out that the binary relation thus defined on $\mathbf{T} \times \mathbf{T}$ is incomplete, which is why I insisted on the terminology of binary relations and not, less generally, payoff functions. Indeed, it is this incompleteness

have recently summarized much of what I know about this model in Roemer (2001), which also includes a number of applications of the model.

Let me describe two of these applications. We are given a population with utility functions

$$u(x,y) = x - \alpha(y - r)^2,$$

where x is income and y is the religious position of the government. The individual above has an ideal religious position of r. A *type* is specified by an ordered pair (w,r), where w is the real wage the individual of that type earns, and r is the type's religious position. The population is specified by a probability measure **F** on the set of types. For simplicity, we assume that the value α is common to all types; it is called the *salience* of the religious issue.

This , then, is an example where there is one good and one principle. Our concern is how the citizenry's views on the principle will affect economic distribution.

In Roemer (2001), I prove that, if the distribution **F** satisfies a property that I will state momentarily, and if the salience α is sufficiently large, then in all political equlibria of the model, both parties will propose a tax rate of zero – that is, no redistribution – even though it may be the case that the majority of citizens have an *ideal* tax rate of unity (that is, would most like complete redistribution of income to the mean). The condition in question is:

A. the mean real wage of the cohort of citizens who have the median religious view is greater than the mean real wage of the population .

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that enables us to overcome the non-existence of Nash equilibrium in multi-dimensional policy spaces associated with the Downs model of politics.

If, on the other hand,

the mean real wage of the cohort of citizens who have the median religious view is less than the mean real wage of the population ,

then, if salience is sufficiently high, all political equilibria will entail a tax rate of unity.

In other words, views on principles can radically effect economic distribution through the political mechanism, even if the principle itself has no direct economic implications.

More generally, if *A* holds, then we can do comparative statics: as the salience α increases, the tax rate falls in equilibrium.

This example, I think, shows how considering *political* economy can radically alter our theories of distribution. Of course, what I have called the 'religious' principle here could just as well be an attitude about race, or ethnicity, or justice. The views that a society has on principles, once those principles become issues upon which political parties can (or must) take positions (i.e., policies), will in general have important effects on the distribution of income.

A second example (Roemer[1999]) is purely economic – that is, there are no principles involved. The production side of the economy is as it has been in all the examples I have given: there is a single consumption good produced by a constant-returns technology, with labor as the sole input, and individuals are endowed with different levels of skill, or efficiency units of labor power. There is no preference for leisure, so each citizen produces the maximum amount of good that she can in unit time. The political issue is to choose a quadratic income -tax rule: thus, taxation need not be linear, but can be progressive or regressive, in the sense of rising or falling marginal tax

rates. The policy space, because of a budget constraint, turns out to be two dimensional. In political equilibrium, there is always a 'right' ('left') party, which represents all citizens with wages greater than (resp., less than) a certain pivot wage. The result is, roughly speaking, that if the median wage is less than the average wage, then in all political equilibria, both parties propose progressive tax regimes. Thus political competition, if the income distribution is left-skewed, induces even the Right party to increase marginal tax rates with income.

There are even models where the set of policies is infinite dimensional, and political equilibria exist. For example, generalizing from the last example, one can work with models where the tax policy a party proposes can be any continuous function of income. Interestingly, the political-economic equilibria we get in these models are piece-wise linear tax rules, which is what we observe in most advanced democracies.

3. Conclusion

Value and politics are intertwined because economic interests affect political organization and competition, which in turn reflect economic variables and, in particular, distribution. The modern problem of value, I assert, is to understand the nature of this mutual determination.

In an elegant, recent article in the *Journal of Economic Literature*, Makowski and Ostroy (2001) resurrect an expression of Schumpeter's, that science is 'tooled knowledge.' I would like to use this insight to describe the evolution of political economy. Adam Smith and David Ricardo certainly had views about how economic interests affect political decisions which in turn affect economic distribution, but the

knowledge was not tooled, it was semi-anecdotal. Social science has now, two centuries or so later, developed the tools – in particular, general equilibrium theory and game theory – that enable us to convert that knowledge into science.

I expounded an abstract model of political-economic equilibrium in this lecture in order to demonstrate that we are only at the very dawn of that science. For the examples we have of political-economic equilibrium -- that is, specific models deriving from that general one-- are still primitive, in the sense that they either compress the economic side or the political side much more than we would like. It is difficult to derive clean conclusions, without that kind of unilateral compression – or at least, such is the case with our present understanding. Of course, with the advent of powerful computers, we can probably learn a good deal from simulation, and this allows us to work with models in which both the economic and political side are reasonably complex. These methods have, thus far, barely been touched in political economy.

In other words, this is an exciting period in the new science of political economy[5].

[5] Recent books, to which the interested reader, can refer, in addition to this lecturer's, are Austen-Smith and Banks (1999) and Persson and Tabellini (2000).

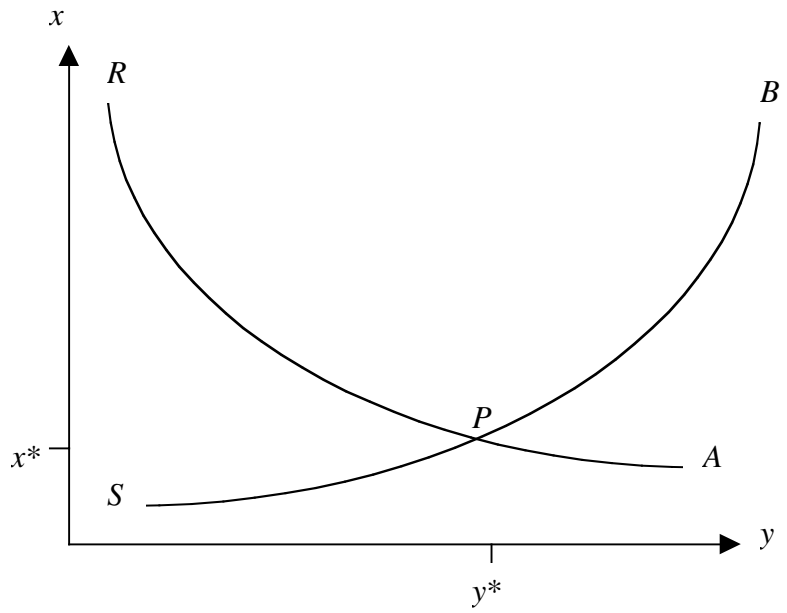

Figure 1

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