Queen's Economics Department Working Paper No. 1279

Campaign Advertising, Redistribution and the Gap between Incomes of Rich and Poor

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11-2011

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November 16, 2011

Abstract: The effect of a widening of the distribution of income upon society's choice of the amount of redistribution is a balancing of two opposing forces: the *increase* in redistribution in response to the increased ratio of mean to median income and the *decrease* in response to the greater advertising advantage of the wealthier half of the population. One cannot say a priori which force predominates.

This essay is in defence of a very simple proposition. Normally, one would suppose that an exogenous widening of the gap between the incomes of the richer half and the poorer half of the population - due, for example, to increased trade with low-income countries or to labour-saving technical change - would lead society to supply more redistribution of income. By increasing the ratio of mean and median income, a widening of the income distribution, would be expected to increase the amount of redistribution that the median voter prefers.

The proposition is that the process can be reversed by campaign advertising. The greater the gap between the incomes of rich and poor, the greater the advertising advantage of the party of the rich and - in so far as campaign advertising persuades voters about the consequences of economic policy - the more likely it becomes that the median voter is persuaded to prefer less rather than more redistribution. The proposition is not that the median voter must prefer less redistribution, but that he may be persuaded to do so.

A simple model is set up where the proposition is true. The model differs from many other models of the overlap between politics and public finance in postulating a sharp division between the party of the rich and the party of the poor, in treating tax evasion as the sole source of deadweight loss and in allowing campaign advertising to influence voters' expectations about the consequences of economic policy rather than about the competence of politicians.

The paper begins with a simple model of a society with two political parties, a left party serving the interests of the poorer half of the population and a right party serving the interests of the richer half, with a negative income tax as the representative of all redistribution of income and with tax evasion as the sole source of deadweight loss. A Pareto distribution of income is then introduced, allowing the median voter's preferred tax rate to depend on just two parameters, representing the width of the distribution of income and the efficiency of tax collection. Campaign advertising is directed to influencing people's opinions about the efficiency of tax collection. Tax collection is portrayed as inefficient by the party of the rich and as efficient by the party of the poor. On these assumptions, a spontaneous widening of the distribution of income leads to more redistribution in the absence of campaign advertising, but not necessarily once campaign advertising begins to influence public opinion. Modifications of the assumptions are discussed. The mechanics of the Pareto distribution and a list of influences of advertising on opinion are discussed in appendices.

Campaign Advertising in the Politics of Rich and Poor

In the absence of campaign advertising, a widening of the distribution of income would provoke additional redistribution of income. Campaign advertising may reverse this effect, leading to less rather than more redistribution when there is a widening of the gap between the incomes of rich and poor. These propositions will be established on the strength of the following six assumptions:

1) Society: There is a Pareto distribution of peoples' gross, pre-tax, pre-transfer incomes allowing income equality to be represented by a single parameter, α, varying from 1 to infinity, where $\alpha = 1$ signifies that the distribution of income is as unequal as it can ever be and $\alpha =$ infinity signifies full equality of income. The ratio of mean to median income and the ratio of the total income of the richest half of the population to the total income of the richest half of the population are both decreasing functions of the equality, α, in the distribution of income.

2) Politics: Politics is exclusively about the redistribution of income by means of a negative income tax, to be looked upon here as a surrogate for all redistributive policy: welfare, unemployment insurance, public provision of health care and so on. All public revenue is acquired by a flat tax at a rate t and then redistributed in equal amounts to every taxpayer. Public overhead cost and other public expenditures are abstracted away. The amount of redistribution is unambiguously represented by the rate of tax, t, and the choice of that rate is the only issue to be resolved collectively.

3) Parties: Elections are between a left party representing the poorer half of the population and a right party representing the richer half of the population. Think of the "ideal" platforms for supporters of each political party as the preferred tax rate of the median voter among its supporters alone. In the simple model developed here, platforms of both parties are drawn to the first preference of the median voter in society as a whole. As will be discussed later on, there are forces drawing actual platforms apart, but a change in the first preference of the median voter in society as a whole can be expected to draw platforms of both parties in that direction.

4) Deadweight Loss: A person`preferred tax rate is a trade-off the benefit from sharing income with the average voter and the full cost of taxation inclusive of both the cost of tax actually paid and of the cost of tax avoidance, of, one way or another, reducing the size of one`s observable tax base. In reality, there are many sources of deadweight loss in taxation: reversion to do-it-yourself activities, the labour-leisure choice, the choice between consumption and investment, and so on. For the purposes of this article, tax evasion alone is sufficient. To avoid problems associated with the probability that tax evasion will be detected and with the pubic choice of fines for tax evasion, it is being assumed that

a) tax evasion is costly but undetectable once the appropriate cost of concealment has been borne,

b) the marginal cost per dollar of tax concealed is an increasing function of the proportion of tax concealed, and

c) the tax payer's cost of concealment as a proportion of gross income concealed depends upon the government's efficiency in tax collection as represented by a parameter β.

Specifically, the τ^{th} percentile of a person's income can be hidden from the tax collector at a cost of $\beta\tau$ cents per dollar concealed, where β is the measure of the government's efficiency of tax collection, an economy-wide parameter indicating how the tax payer's cost of tax evasion varies

with the proportion concealed. The larger β, the costlier does any amount of tax evasion become and the greater is the tax rate at the top of the Laffer curve, the tax rate at which total tax revenue is maximized.

5) Campaign Advertising: Campaign advertising is sometimes looked upon as persuading voters about the competence of politicians. Here it is looked upon instead as persuading voters about the efficiency of tax collection or, equivalently, about the location of the Laffer curve. The left party would like to persuade voters that β is high or, equivalently, that the Laffer curve peaks at a high tax rate. The right party would like to persuade voters that β is low or, equivalently, that the Laffer curve peaks at a low tax rate. The assumption here is that the voters` *perceived* value of β is a decreasing function of the advertising advantage of the right party, where advertising advantage depends upon the ratio of C_R to C_L, where C_R is advertising expenditure by the right party and where C_L is advertising expenditure by the left party. Advertising is often classified as persuasive or informative. Here it is both. Think of advertising as persuading the voter about the efficiency of tax collection, β, by informing them of facts supporting whatever case the advertiser wishes to make. Possible effects of advertising are discussed in Appendix 2.

6) Campaign Contributions: People contribute to political parties in proportion to their incomes, with contributions to the right party from people with incomes above the median and contributions to the left party from people with incomes below the median. Specifically, $C_R/C_L = S^{top}/S^{bottom}$ where S^{top} and S^{bottom} are total incomes of the top and bottom halves of the income distribution.

Together, these six assumptions yield the two proposition in the title of this paper and as stated above: that a widening of the distribution of income, as reflected in an increase in the equality parameter α causes there to be more redistribution of income when the efficiency of tax collection, β, is invariant, but not necessarily when peoples`perceptions of β can be influenced by campaign advertising. These two proposition will be developed in turn. First, a person`s preferred tax rate is computed as a function of β looked upon as a fixed parameter, and then the influence of campaign advertising upon people's perceived β is introduced.

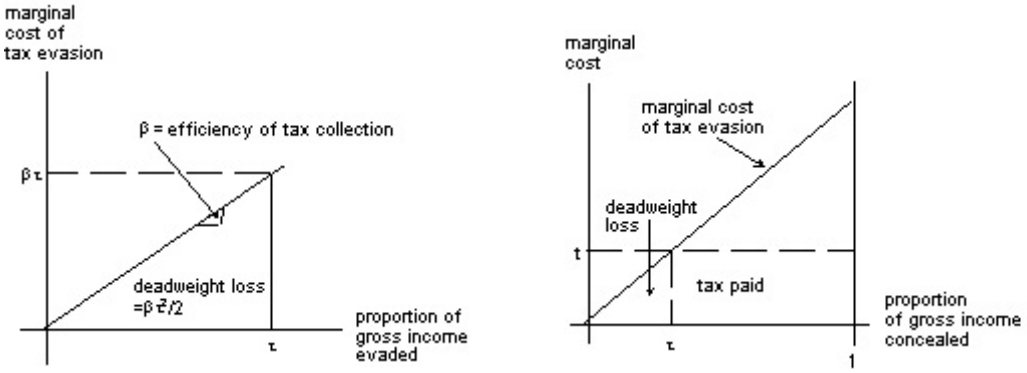
Effects of campaign advertising are invariably multidimensional, with positive party effects for one's own party, negative party effects for the opposition, positive policy effects on items in one's party platform and negative policy effects on the items in the platform of its opponent. In this context, radical simplification is required if anything substantive is to be said about campaign advertising in general. The procedure to be adopted in the rest of this article is to postulate that the net effect of campaign advertising on voters' opinions, to be called the advertising advantage, depends upon the ratio of their campaign expenditures, on the ratio C_R/C_L where C_R and C_L are advertising expenditures of the right and left parties. The higher the ratio of C_R to C_L, the more voters are persuaded by what the right party wants voters to believe, but there

is no net effect on voters' opinions from a doubling of both parties campaign expenditures.[1]

a) How a decrease in equality, α, in the distribution of income leads to an increase in the preferred tax rate of the median voter as long as the efficiency of tax collection, β, is seen as invariant.

This is illustrated in the two sides of figure 1.

Figure 1: Dependence of the proportion of gross income concealed, tax paid and deadweight loss upon the marginal cost of tax evasion.



Confronted with a tax rate t, a person must decide how much of his income to declare and how much to conceal from the tax collector where, by assumption, concealment of income from the tax collector is undetectable as long as the required cost of concealment is borne. The required cost of concealment is such that, as illustrated in the left-hand side of figure 1, the marginal cost of concealment increases together with the proportion, τ, of one's income concealed,

$$\text{the marginal cost of concealment} = \beta\tau \qquad (1)$$

where β may be thought of as the government's efficiency of tax collection because, the higher β, the less advantageous is concealment to the taxpayer and the more of one's income will be declared. Since the marginal cost of concealment increases with τ and the tax rate is constant, concealment is up to the point where

$$\beta\tau = t \qquad (2)$$

[1]On this assumption, a doubling of both parties' campaign expenditure is wasted, but that need not be so if, contrary to what will be assumed for the model in this paper, each party's advertising conveys true information to the voter about, for example, the competence of its candidates.

The total cost of concealment - the deadweight loss in taxation - is $\tau t/2$ as proportion of gross, pre-tax, pre-transfer income, y, or is $\tau ty/2$ in total. Incorporating equation (2),

$$\text{deadweight loss as a proportion of gross income} = t^2/2\beta \qquad (3)$$

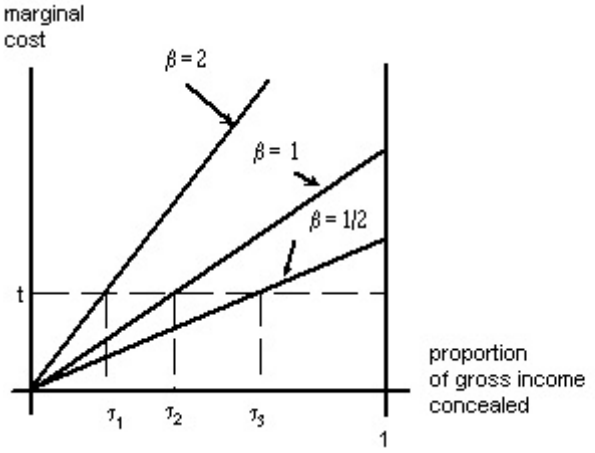
and $$\text{total deadweight loss to a person with income y} = t^2y/2\beta \qquad (4)$$

The portion of a person's income declared is $(1 - \tau)$, tax paid as a proportion of income is $t(1 - \tau)$, tax paid by a person with income y is $t(1 - \tau)y$ or, equivalently, $t(1 - t/\beta)y$. Since tax revenue per head is the average tax paid, the tax revenue as a proportion of average income, R(t), is

$$R(t) = t(1 - t/\beta) \qquad (5)$$

Dependence of tax revenue on the efficiency of tax collection is illustrated in figure 2 which is a reproduction of the right-hand side of figure 1 for three alternative values of β: ½, 1 and 2. It is evident from the figure that, as β increases, the proportion of tax evaded shrinks from τ_3 to τ_2 to τ_1, tax revenue increases accordingly and deadweight loss declines.

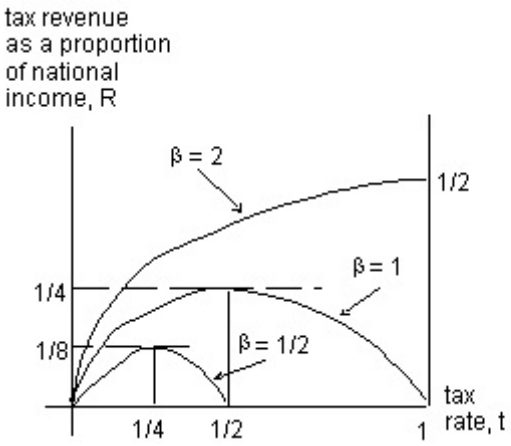
Figure 2:Dependence of the taxpayer's optimal concealment, τ, upon the efficiency of tax collection, β.



The assumption (c) under the heading of "deadweight loss" that the marginal cost to the taxpayer per dollar of tax concealed depends on the proportion of income concealed guarantees that representation in equation (9) of tax revenue as dependent upon the tax rate is equally valid for the individual tax payer and for society as a whole. Interpreted as a proportion of national income, the function R(t) is, in effect, the Laffer curve showing how tax revenue as a function of the tax rate is hump-shaped and how the revenue-maximizing tax rate is an increasing function of β, the efficiency of tax collection. R(t) begins at 0 when t = 0, rising to a maximum of β/4 when t = β/2 (because $\delta R/\delta t = 0$ implies that $2t/\beta = 1$) and falling thereafter to 0 when t = β. Three possible locations of the Laffer curve, for β = ½, β = 1and β = 2, are shown in figure 2.

Note particularly, that, the greater the efficiency of tax collection, the higher the tax rate at which revenue is maximized and the larger maximal revenue must be. The highest of the three curves, that for which $\beta = 2$ is truncated because the tax rate cannot exceed 1. If t is set equal to 1, tax revenue becomes half the national income, wastage resources in concealing income from the tax collector becomes a quarter of the national income and the remaining half is left with the tax payer to be consumed.

Figure 3: How the Location of the Laffer Curve Depends upon the Efficiency of Tax Collection



Now think of a person with gross income y not as choosing how much of his income to conceal, but, knowing how everybody responds to any given tax rate, as deciding what tax rate would suit him best, where his preferred tax rate is a trade-off between his benefit from a share of total tax revenue and his combined cost of the tax he pays and of concealing a part of income from the tax collector. Let t(y) be the preferred tax rate of a person with gross income y. If one could choose the tax rate in a negative income tax for society as a whole, it would be the rate that maximizes one's net, post-tax, post-transfer income, I, where

net income = gross income - tax paid + demogrant - cost of tax evasion.

$$I = y - t(1 - \tau)y + t(1 - \tau)y^{av} - t\tau y/2 \qquad (6)$$

or, equivalently,

$$I(t; y, \beta) = y - t(1 - t/\beta)y + t(1 - t/\beta)y^{av} - \beta t^2/2 \qquad (7)$$

which - as no distinction is being drawn between post-tax, post-transfer income and utility - may be thought of as the utility function over alternative values of t for a person with a gross income y when the efficiency of tax collection is β. The peak of $I(t; y, \beta)$ occurs at the value of t for which

$$\delta I/\delta t = -y + (t/\beta)y + y^{av} - (2t/\beta)y^{av} = 0 \qquad (8)$$

implying that t(y), the value of t preferred by a person with income y, becomes

$$t(y) = \beta\{y^{av} - y\}/\{2\, y^{av} - y\} \qquad (9)$$

as long as $y < y^{av}$. The preferred tax rate falls from β/2 when y equals 0 to 0 when y rises to y^{av}.

On these extreme assumptions, public choice boils down to the selection of of a tax rate t where each person's utility function, I(t; y, β) is humped with a preferred t as a decreasing function of income.[2] These are the conditions required for the median voter theorem guaranteeing that the tax rate preferred by the median voter wins over any other tax rate in a pair-wise vote. The equilibrium tax rate becomes

$$t(y^{med}) = \beta\{y^{av} - y^{med}\}/\{2\, y^{av} - y^{med}\} = \beta\{1 - y^{med}/y^{av}\}/\{2 - y^{med}/y^{av}\} \qquad (10)$$

With two political parties seeking office, both parties are forced to choose $t(y^{med})$ as its platform because a party deviating from $t(y^{med})$ would lose the election.

Notice that, as long as the ratio of median to mean income, y^{med}/y^{av}, rises together with the degree of equality in the distribution of income, then the preferred tax rate falls accordingly. Setting $y^{med}/y^{av} = x$, it follows that

$$\delta\, t(y^{med})/\delta x = \beta\{(2 - x)(-1) - (1 - x)(-1)\}/(2 - x)^2 = -\beta/(2 - x)^2 < 0 \qquad (11)$$

meaning that the preferred tax rate of the median voter falls as y^{med} approaches y^{av}, as one would expect from a narrowing of the distribution of income and is necessarily so for a Pareto distribution of gross income defined by the property that the proportion of the population with income in excess of y is $(y^{min}/y)^{\alpha}$ where y^{min} is the lowest of all incomes and α is the equality parameter. As shown in the appendix,

$$y^{med}/y^{av} = 2^{1/\alpha}(\alpha - 1)/\alpha \quad \text{and} \quad \delta[2^{1/\alpha}(\alpha - 1)/\alpha]/\delta\alpha > 0 \qquad (12)$$

so that

$$\delta\, t(y^{med})/\delta\alpha < 0 \qquad (13)$$

As long as β is seen by everybody as a fixed and invariant parameter, the median voter`s preferred t falls in response to increasing equality in the distribution of income widens, and rises together with the gap between rich and poor, exactly as stated in the opening paragraph of this paper.

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[2]Strictly speaking, the utility function is only humped for values of y less than y^{av}. Otherwise, a person's preferred tax rate is o. That does not matter here as long as the income of the median voter is less than y^{av}.

b) ***How campaign advertising may cause a rise in the inequality of income to provoke less rather than more redistribution of income.***

So far, assumptions (5) and (6) are inoperative because there has been nothing to advertise about. Now let it be assumed instead that the government`s efficiency in tax collection, β, and the resulting location of the Laffer curve are not known with certainty but are matters of opinion subject to influence by campaign advertising. The Laffer curve peaks at a low tax rate says the right-winger who, incidentally, tends to gain from low tax rates. The Laffer curve peaks at a high tax rate says the left-winger who, incidentally, tends to gain from the redistribution that high tax rates finance. "Government spending kills jobs." "Government spending creates jobs." To be sure, campaign advertising may supply true information about the qualities and the policies of the candidates, but campaign advertising may in part be persuasive or selective in the information it provides when the consequences of public policy are not immediately obvious to all. The latter assumption is employed here. Specifically, parties are assumed to advertise about the size of β which is the only policy variable and which as shown in figure 2, governs the location of the peak of the Laffer curve. Two assumptions are employed. The first is that everybody's perceived value of β is a decreasing function of the ratio of campaign expenditures.

$$\beta = \beta(C_R / C_L) \qquad (14)$$

where C_R and C_L are campaign expenditures of the right and left parties and where

$$\delta\beta/\delta(C_R / C_{L)} < 0 \qquad (15)$$

meaning that, the greater the advertising advantage of the right party, the less efficient at tax collection the government is believed to be and the lower is the tax rate at the peak of the perceived Laffer curve.

The other assumption is that people contribute to political parties in proportion to their incomes, with contributions to the right party from people with incomes above the median and contributions to the left party from people with incomes below the median. Specifically,

$$C_R/C_L = S^{top}/S^{bottom} \qquad (16)$$

where S^{top} is the sum of the incomes of the wealthiest half of the population (everybody with income above the median), and S^{bottom} is the sum of the incomes in the poorest half of the population. Obviously, the more unequal the distribution of income, the greater the ratio S^{top}/S^{bottom} must be. As shown in the appendix, conformity of the actual distribution of income to the Pareto distribution requires that

$$S^{top}/S^{bottom} = 1/(2^{(\alpha - 1)/\alpha} - 1) \qquad (17)$$

where α is the measure of equality and

$$\delta\{S^{top}/S^{bottom}\}/\delta\alpha < 0 \qquad (18)$$

Together equations (18) and (16) imply that a widening of the distribution (a fall in α when the distribution is Pareto) implies an increase in the ratio of income shares, S^{top}/S^{bottom}, which in turn supplies an advertising advantage, C_R/C_L, to the right party.

Pulling all this together, the equilibrium tax rate becomes

$$t(y^{med}, \beta) = \beta\{1 - y^{med}/y^{av}\}/\{2 - y^{med}/y^{av}\} = \beta z \qquad (19)$$

where $z = \{1 - y^{med}/y^{av}\}/\{2 - y^{med}/y^{av}\}$, $\delta z/\delta\{y^{med}/y^{av}\} < 0$, $\delta\{y^{med}/y^{av}\}/\alpha > 0$ as shown above and where advertising affects the perceived value of β in accordance with assumptions (1) and (2), so that $\beta = \beta(C_R/C_L)$, $\delta\beta/\delta(C_R/C_L) > 0$ and $C_R/C_L = S^{top}/S^{bottom}$.

The central proposition of this paper can now be established. Since both β and z are functions of the degree of equality, α, in the distribution of income, the median voter's preferred tax rate must be a function of α as well.

$$\delta\, t(y^{med}, \beta)/\delta\alpha = \beta\delta z/\delta\alpha + z\delta\beta/\delta\alpha \qquad (20)$$

where $\beta\delta z/\delta\alpha$, which might be called the "median voter effect", is the influence of a narrowing of the distribution of income upon the preferred tax rate of the median voter when the efficiency of tax collection is invariant and where $z\delta\beta/\delta\alpha$, which might be called the "advertising effect" is the influence - through the intermediary of campaign advertising - of the median voter's perception the efficiency of tax collection.

The median voter effect is necessarily negative because

$$\delta z/\delta\alpha = [\delta z/\delta\{y^{med}/y^{av}\}][\,\delta\{y^{med}/y^{av}\}/\alpha] < 0 \qquad (21)$$

The persuasion effect is positive because

$$\delta\beta/\delta\alpha = [\delta\beta/\delta A][\delta A/\{S^{top}/S^{bottom}\}][\delta\{S^{top}/S^{bottom}\}/\delta\alpha > 0 \qquad (22)$$

It then follows that the amount of redistribution of income as reflected in the median voter's preferred tax rate for the negative income tax may or may not increase depending on the strengths of the median voter effect and the advertising effect. Q.E.D.

Comments on the Assumptions

1) The Triumph of the First Preference of the Median Voter: The model as set out above has the curious feature that parties compete to persuade voters about tax rates - the right party whose supporters gain from low taxes seeking to persuade all other voters that low taxes are in their interest too, and the left party whose supporters gain from high taxes seeking to persuade all other voters that high taxes are in their interest too - but that the tax rates in the parties' platforms turn out to be exactly the same! Useful for focussing on an interesting aspect of campaign financing, this rather silly result is characteristic of the median voter theorem in other contexts as well and several modifications of the median voter theorem have been proposed to circumvent it.

Coate (2004) has circumvented this implication of the median voter theorem by the introduction of uncertainty. In a stripped down version of his procedure, voting is about a policy, x, within the range from 0 to 1, in a society with three voters and two political parties. There is a left-leaning voter whose first preference for x is 0 and whose utility of x is $- x^2$, there is a right-leaning voter whose first preference for x is 1 and whose utility of x is $- (1 - x)^2$, and there is a swing voter whose first preference for x is a random variable with equal chances of lying anywhere between 0 and 1. Having to vote for one of two values of x, the swing voter always choose the value of x closest to his first preference, wherever that turns out to be. There is a left political party that serves the interest of the left voter, and a right political party that serves the interest of the right voter. Their platforms are x_L and x_R. The left party would like to set $x_L = 0$, but it cannot do so because that would surely lose it the election. The right party would like to set $x_R = 1$, but it cannot do so for the same reason. The parties choose x_L and x_R to maximize expected utilities, balancing the interests of their supporters and the chances of their being elected.

The outcome is a Nash equilibrium where each party chooses its platform on the assumption that the platform of the other party is given. For any given choice of x_R by the right party, the left party chooses x_L to maximize expected utility defined as

$$[- x_L^2][(x_L + x_R)/2] + [- x_R^2][1 - (x_L + x_R)/2] \qquad (23)$$

where $[- x_L^2]$ and $[- x_R^2]$ are the utilities of the left party in the event of a win for the left and right parties respectively, and $[(x_L + x_R)/2]$ is the probability that the swing voter votes for the left party. Maximizing the utility of the left party with respect to x_L, yields the first order condition

$$3x_L^2 + 2x_L x_R - x_R^2 = 0 \qquad (24)$$

Values of x_L and x_R are derivable from this equation together with the symmetry condition requiring both parties' platforms to be equidistant, to the left and to the right, from the parties' first preferences, 0 and 1, so that

$$x_L = 1 - x_R \qquad (25)$$

implying immediately that $x_L = 1/4$ and $x_R = 3/4$, on either side of the expected first preference,

which is ½ in this case, of the median voter. It is characteristic of this pattern of uncertainty for party platforms to lie on either side of the first preference of the median voter so that, if the median voter's first preference moves spontaneously one way or another or if it can be pushed by advertising, the platforms of both competing political parties can be expected to move in that direction too, a phenomenon discussed in some detail in Austin-Smith (1987).
Anything that pushes the median voter's first preference to the left or to the right may be expected to have the same effect on both x_L and x_R as well.

Though it might be complicated, one can imagine how uncertainty about voters' preferences might be incorporated into the model of campaign advertising in the body of this paper to allow for differences in party platforms without removing the parties' incentives to persuade voters that their preferred policies are best for the expected median voter and for the country as a whole.

Divergent platforms can also be explained by the introduction of party activists who work to persuade citizens of the virtues of their preferred party and to get out and vote. Ulander (1989) and Morton (1987) have developed models in which platforms differ to provide incentives for activists who would not bother to support a party with a platform no different from that of its opponent.

Divergent platforms can also be explained by the multiplication of issues under the headings of left and right. If the party favouring low taxation is also in favour of permitting abortion while the party favouring high taxes is against permitting abortion, then, as will be discussed below, the tax rates in the parties' platforms can differ without one party giving up all hope of winning the election.

2) Policy and Party: So far campaign advertising is politically neutral in the special sense of influencing voters' perceptions of policy but leaving voters indifferent between parties when their choices of policy are the same. With t as the only policy choice, voters are indifferent between left and right parties as long as both parties adopt the same t as their platforms.

This is illustrated in figure 2 with the tax rate on the horizontal axis and the utility of the median voter on the horizontal axis where, for the moment utility and net income are the same because net income is the only component of the utility function. As a function of t, the utility of the median voter becomes

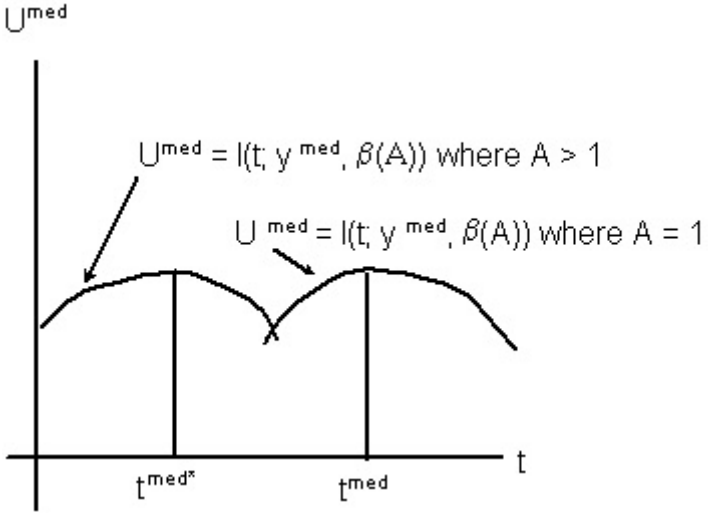
$$U^{med} = I(t; y^{med}, \beta) \qquad (26)$$

where y^{med} is the gross income of the median voter and the expression for net income, $I(t; y^{med}, \beta)$, is as defined in equation (6) above. The utility function is humped with a peak at whatever t maximizes the net income of the median voter.

The two utility functions in figure 4 differ in the voter's perceived value of β. The right

hand curve is for β as it would be with no advertising advantage at all, that is, if $C_L = C_R$. Setting $C_R/C_L = A$, the left hand curve is for β as it would be for some value of $A > 1$, meaning that the right party has the advertising advantage. The increase in A shifts the median voter's preferred t from t^{med} to t^{med*}. An advertising advantage for the right party has lowered the median voter's preferred tax rate, forcing the left party to adopt the lower rate in its platform if it hopes to retain any chance of winning the election.

Figure 4: Campaign Advertising Shifts the Utility Function of the Median Voter



There is another possibility. As illustrated in figure 5, an advertising advantage for the right party might create a preference for the right party over the left party at any common value of t. Now the efficiency of tax collection, β, is invariant, but a value of $A > 0$ creates a gap, for any given values of t and β, between U^{med}_L and U^{med}_R which are the median voter's utilities depending on which party wins the election. Specifically,

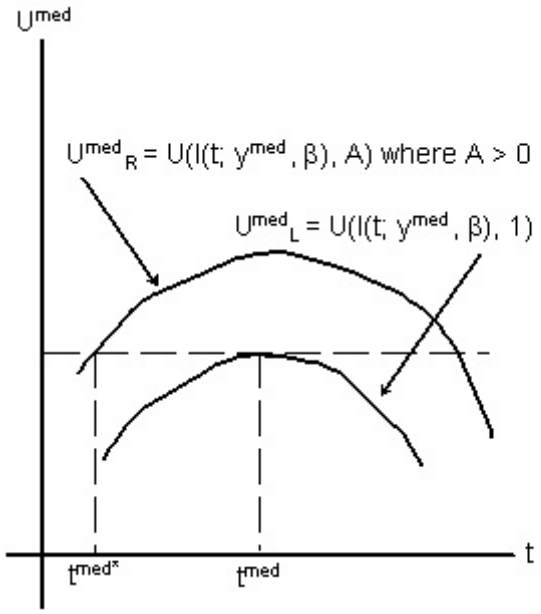
$$U^{med}_L = U(I(t; y^{med}, \beta), 1) \quad \text{and } U^{med}_R = U(I(t; y^{med}, \beta), A) \qquad (27)$$

so that $U^{med}_R > U^{med}_L$ if and only if $A > 1$. As shown in the figure, an advertising advantage for the right party raises the utility function of the median voter in the event of a win for the right party, assuring that the right party wins when both parties choose $t = t^{med}$ which is the first preference of the median voter. The right party could adopt t^{med} as its platform, but, being in favour of low taxes, it might reduce the rate in its platform to as little as $t^{med}*$ without losing the election.

Strictly speaking, the assumptions leading to the situation described in figure 5 would imply that the advertising advantage of the right party allows the right party to capture the vote of the median voter and to win the election with a tax rate as low as $t^{med}*$ despite the fact that, other things being equal, the median voter would prefer a tax rate of t^{med}. Of course other things are not equal. The implication of the analysis is not that the right party is sure to win, but that the favourable

impression of the right party created by advertising allows the right party to supply less redistribution than the median voter would prefer without automatically losing the election.

Figure 5: Advertising Influence upon Voters' Perceptions of Parties Rather than Policies



3) The Truth: A characteristic of the core model in this paper is that voters are persuaded by campaign advertising of something that is in the interest of the advertiser to have people believe. It is in the interest of the right party and its supporters for voters to believe that the efficiency of tax collection is low, or, more generally, that the Laffer curve peaks at a relatively low tax rate. It is in the interest of the left party and its supporters to downplay the deadweight loss in tax collection, especially as the greater burden of taxation is borne by the rich. What is not discussed is the truth of the matter. There must be some true value of β. Campaign advertising can only be effective if there is no conclusive evidence of what that value might be or if a significant number of people is open to persuasion regardless. That is no less so about the implications of public policy as it is about the quality of politicians in the models of Prat and Coate discussed above. The location of the Laffer curve is a good example of such ambiguity because there is no consensus among investigators about where its peak may be. "Public spending kills jobs." "Public spending creates jobs." The case for one proposition is not strong enough to silence the proponents of the other.

Two strong assumptions have been employed at different stages of the analysis. Before introducing campaign advertising, it was assumed that the size of β was a universally recognized and undisputed fact. Afterwards, the size of β was demoted from a fact to a widely-held opinion subject to influence by advertising. But there is a conundrum in the latter interpretation. The assumption that each person knows his own marginal cost of concealment (βτ) does not square with the assumption that voters can be persuaded by advertising about the value of β in society as a whole. A way out of this conundrum would be to assume that people are sure of their own values

of β but are uncertain and subject to persuasion about the average value of β in society as a whole. A broader model might incorporate this consideration.

4)Rich and Poor: Readers can hardly help noticing a certain Marxist flavour to the model in this paper where all politics is a conflict between the parties of the rich and the poor. On the other hand, there is no identification of the rich with capitalists and of the poor with workers, no clear boundary line between rich and poor, and no explanation of why people's gross incomes are what they are assumed to be. The distribution of income at any moment of time is a postulated fact.

Identification of the left party with the poorer half of the population and of the right party with the richer half of the population is a useful simplification, but is surely less than the whole truth. Party platforms are collections of policies designed to appeal to complex and intertwined groups of people. A party might choose policies in support of fundamentalist religion or of certain industries or of people in certain regions of the country. Nor is there any allowance in the model for politicians seeking office for its own sake, of the skills of politicians or of the advantages of incumbency. All of these considerations might in principle be combined with the conflict between rich and poor in a larger but less tractable model of how politics works.

Simplifications in this model can be justified as a way of focussing on aspects of politics that might otherwise be given too little attention. Alas, there is some indication that the extreme assumptions in this model are becoming less unrealistic with the course of time.

The postulated contribution of the rich to the party of the rich and of the poor to the party of the poor requires a class-based altruism that is less than completely accurate. Strictly self-interested people would not contribute at all for the same reason they would not vote: that there is too little chance of one's contribution, or one's vote, swinging the election from the party one opposes to the party one favours. On the other hand, the complex set of motives that induces a significant proportion of the population to vote may well induce political contributions as well. It is assumed in this paper that contributions are directed more by concern with the welfare of one' own social class rather than the welfare of society as a whole. The assumption is not universally valid. Some rich people support the party of the poor. Some poor people support the party of the rich.[3]

Class-based campaign contributions may be explained by the organization of groups. As analysed in detail by Olsen (1965), unified class action is up against the free rider problem. Campaign contributions of like-minded voters are like private provision of public goods, beneficial to all like-minded voters regardless of whether or not they pay a share of the cost. The free-rider problem need not affect the degree of redistribution in society if the free rider problem were equally severe to rich and poor alike, but that is unlikely to be so. When each contributor supplies

[3]The distinction between class-based and society-wide altruism in the decision to vote rather than to abstain is discussed in some detail in Feddersen (2004). The working assumption here is that whatever motivates people to vote motivates them to make campaign contributions as well, and that the altruistic motive is, at least in part, class-based rather than economy-wide.

the same proportion of income to the lobby, the number of contributors required to raise a given amount of money for campaign advertising is smaller for the rich than for the poor. Fifty people with incomes of $20,000 each are required to match the contribution of one millionaire, and some people are wealthy enough to finance tea parties all by themselves. Lobbies may represent single firms or small numbers of firms with common interests. There is no lobby representing beggars or the unemployed. The advantage of the poor from the discrepancy between mean and median income may be more than compensated by the advantage of the rich in the formation and financing of lobbies.[4]

Voters acquire information about political parties from radio and television quite apart from campaign advertising per se, but radio and television can themselves be biassed in the interest of their advertisers or their owners who are for the most part rich.[5]

5) Campaign Advertising: The most contentious and least well-grounded in self-interest of the assumptions employed here are those about the willingness of people to supply campaign contributions and the effect of campaign advertising on voters' opinions. Large donations by industry associations can be explained as purchases of favours at the disposal of the party in office. Small contributions of$20 or $100 cannot be explained that way, for it is extremely unlikely that the contributor's expected gain from contributing exceeds the cost of the donation itself. A donation of $20 allows the recipient party to increase campaign expenditure by that amount. If the extra campaign expenditure increases the party's chance of winning the election by one chance in a million, the benefit of that win to the donor would have to exceed $20 million to make the donation advantageous. That is simply too high, and no reasonable juggling of the numbers in the example can help. The problem of why people donate to candidates or political parties is analogous to be problem of why people vote. The "paradox of no voting" has its counterpart in a "paradox of not contributing". But people do contribute to political parties, and the assumption here is that contributions are, on average, proportional to income.[6]

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[4]Sometimes even a single rich contributor will do. See Mayer (2011).

[5]There is no bright line between campaign advertising and ordinary news. Supporters of all parties are inclined to see media bias on the other side. Introduction of the right-leaning Fox news in many American towns in the years before the 2000 Presidential election has been estimated to have raised the Republican vote in those towns by about half of one percent. Vigna et. al. (2006).

[6]Information supplied by campaign advertising may influence the platforms and the behaviour of political parties. Contrary to what we have so far been assuming, campaign advertising may improve the quality of political parties by revealing virtues and defects. Campaign advertising, especially negative advertising, may block corruption and promote competent politicians by revealing candidates for what they are.

The other advertising assumption is that voters' opinions are influenced by the ratio of parties' advertising expenditures. As discussed in the first section of this paper, it is likely that campaign advertising has many, among them the conveyance of true information about the policies of political parties and the skills of the candidates for office. All that is abstracted away in this essay to focus upon persuasion, if only by bombarding voters with scraps of information favourable to the advertising party. That ads influence voters' perceptions of policy is partly true and is a useful contrast to the assumption in other literature on campaign advertising that ads communicate or verify truth about the competence of politicians or parties.

On the other hand, very little is demanded of these assumptions. The exact forms of equations (14) and (19) specifying the sources and consequences of campaign advertising are not essential to the argument. All that is required is that people contribute more to the parties they favour when their incomes increase, contribute less when their incomes decline and are influenced to some extent by the number of ads they see.

Implications for Public Policy

It would be nice to be able to draw a clear and unambiguous conclusions about public policy toward campaign advertising. That unrestricted contributions should (or should not) be allowed, that government should (or should not) supply candidates with funds, that political action committees should (or should not) be given free reign. We cannot do so because all of the accounts of campaign advertising in the first section of this paper are partially (if not entirely) valid. Surely there is enough real information in campaign advertising - if only about the names of the candidates, their biographies and the policies they support - to justify the practice. On the other hand, a major disproportion between the parties in their capacities to raise funds can create false impressions by repetition of mantras, by provision of many scraps of information favourable to one side of the other or through dubious claims that the other party does not have the resources to dispute.

Money does buy votes. The larger a party's coffers, the more votes it can buy, supplying the party serving the rich and the well-organized with a distinct edge over the party serving the poor and the badly-organized. Sometimes numbers can outweigh this consideration, but not necessarily so. Money buys votes not by outright dishonesty (though that may arise too) but by selective presentation of the truth. Hence the case for public provision of campaign funds to all competing political parties as a way of increasing the likelihood, and equating likelihoods for competing political parties, that all important truths are revealed. [7]

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[7]It may still be the case as argued by Freeman and Franz (2004) that campaign advertising is beneficial to democracy by providing voters with information about competing candidates and policies of political parties, information that many voters may be unable or unlikely to acquire in any other way.

References

Andreoni, James, "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence", *Journal of Political Economy*, 1989, 1447-58.

Austen-Smith, David, "Interest Groups, Campaign Contributions and Probabilistic Voting", *Public Choice*, 1987, 123-139.

Becker, Gary and Murphy, Kevin, "A Simple Theory of Advertising as Good or Bad", *Quarterly Journal of Economics* , 1993, 941-64.

Bronfenbrenner, Martin, *Income Distribution Theory*, Aldine Atherton Press, 1971.

Coate, Stephen, "Political Competition with Campaign Contributions and Informative Advertising", *Journal of the European Economic Association*, 2004, 772-804.

Coate, Stephen, "Pareto-Improving Campaign Finance Policy", *American Economic Review*, 2004, 628-55.

Feddersen, Timothy, "Rational Choice Theory and the Paradox of Not Voting", *Journal of Economic Perspectives*, 2004, 99-112.

Freeman, Paul, Franz, Michael and Kenneth Goldstein, "Campaign Advertising and Democratic Citizenship", *American Journal of Political Science*, 2004, 732-41.

Grossman, Gene and Helpman, Elhanan, "Protection for Sale", *American Economic Review*, 1994, 833-50.

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Grossman, Gene and Helpman, Elhanan, , *American Economic Review*, "Electoral Competition and special Interest Politics", *Review of Economic Studies*, 1996, 265-86.

Mayer, Jane, "Funding the New Right", *The New Yorker*, October 10, 2011, 90-100.

Milgrom, P. and Roberts, J., "Price and Advertising Signals of Product Quality", *Journal of Political Economy*, 1986. 796-821.

Morton, "Groups in rational Turnout Models",*Social Choice and Welfare*, 1987, 117-31.

Nelson, Philip, "Advertising as Information", *Journal of Political Economy*, 1974, 729-54.

Olsen, Mancur, *The Logic of Collective Action*, Cambridge University Press, 1965.

Pratt, Andrea, "Rational Voters and Political Advertising", *Oxford Handbook of Political Economy*, (Barry Weingast and Donald Wittman, eds.), 2006.

Ulander, Carol, "Rational Turnout: The Neglected role of Groups", *American Journal of Political Science*, 1989, 390-422.

Vigna, Stefano, D. and Ethan Kaplan, "The Fox News Effect: Media Bias and Voting", National Bureau of Economic Research, Working Paper #12169, April 2006.

Appendix 1: How the ratio of Median to Mean Income and the Ratio of Income Shares of the Top Half and the Bottom Half of the Income Distribution are Dependent on α, the Indicator of Equality in the Pareto Distribution.

The Pareto distribution is defined by the property that proportion of the population with incomes in *excess* of y is $(y^{min}/y)^{\alpha}$ where α is a parameter that lies between 1 at which the income distribution is an unequal as it can be and infinity at which there is full equality of income.

- The density function is

$$f(y) = -\delta\{(y^{min}/y)^{\alpha}\}/\delta\{y\} = -(y^{min})^{\alpha}(-\alpha)y^{-\alpha-1} = \alpha(y^{min})^{\alpha}/(y)^{\alpha+1}$$

- The two key integrals are

$$\int f(y)dy = \alpha(y^{min})^{\alpha}\int y^{-\alpha-1}dy = -(y^{min}/y)^{\alpha}$$

and $$\int yf(y)dy = \alpha(y^{min})^{\alpha}\int y(y^{-\alpha-1})dy = \alpha(y^{min})^{\alpha}\int y^{-\alpha}dy$$

$$= -[\alpha/(\alpha-1)](y^{min})^{\alpha}y^{-\alpha+1}$$

- Average income is

$$y^{av} = \int yf(y)dy \text{ from } y^{min} \text{ to } \infty$$

$$= -\{[\alpha/(\alpha-1)](y^{min})^{\alpha}(\infty)^{-\alpha+1} - [\alpha/(\alpha-1)](y^{min})^{\alpha}(y^{min})^{-\alpha+1}\}$$

$$= \alpha/(\alpha-1)]y^{min}$$

- Median income, y^{med} , is such that

$$\int f(y)dy \text{ from } y^{min} \text{ to } y^{med} = \int f(y)dy \text{ from } y^{med} \text{ to } \infty$$

so that $$-(y^{min}/y^{med})^{\alpha} + (y^{min}/y^{min})^{\alpha} = -(y^{min}/\infty)^{\alpha} + (y^{min}/y^{med})^{\alpha}$$

so that $$2(y^{min}/y^{med})^{\alpha} = 1$$

and $$y^{med} = 2^{1/\alpha}y^{min}$$

- The ratio of median to mean income is

$$y^{med}/y^{av} = 2^{1/\alpha}(\alpha-1)/\alpha$$

which is an increasing function of α because both $2^{1/\alpha}$ and $(\alpha-1)/\alpha$ are increasing functions of α.

$$\delta[2^{1/\alpha}(\alpha - 1)/\alpha]/\delta\alpha = (2^{1/\alpha})\delta[(\alpha - 1)/\alpha]/\delta\alpha + [(\alpha - 1)/\alpha]\delta[2^{1/\alpha}]/\delta\alpha$$

$$= (2^{1/\alpha})[1/\alpha^2] + [(\alpha - 1)/\alpha][2^{1-\alpha)/\alpha}]/\alpha > 0$$

- The ratio of total income in the wealthiest half of the population to total income in the poorest half of the population is

$$S^{top}/S^{bottom} = \{\int yf(y)dy \text{ from } y^{med} \text{ to } \infty\}/\{\int yf(y)dy \text{ from } y^{min} \text{ to } y^{med}\}$$

$$= \{(\infty)^{-\alpha+1} - (y^{med})^{-\alpha+1}\}/\{(y^{med})^{-\alpha+1} - (y^{min})^{-\alpha+1}\}$$

$$= \{-(2^{1/\alpha})^{-\alpha+1}\}/\{(2^{1/\alpha})^{-\alpha+1} - 1\}$$

$$= 1/(2^{(\alpha-1)/\alpha} - 1)$$

- The ratio of top to bottom income shares is a decreasing function of income because

$$\delta\{S^{top}/S^{bottom}\}/\delta\alpha = \delta[(2^{(\alpha-1)/\alpha} - 1)^{-1}]/\delta\alpha$$

$$= (-1)[(2^{(\alpha-1)/\alpha} - 1)^{-2}][(\alpha - 1)/\alpha][2^{-1/\alpha}] < 0$$

Note that, as α increases from 1 to infinity (from the least to the greatest possible equality) , the ratio S^{top}/S^{bottom} falls from infinity to 1.

Appendix 2: ***Effects of Campaign Advertising***

Advertising is sometimes classified as either informative or persuasive, but a more detailed classification is appropriate here because the selection of facts and emphasis upon facts placing one's party in a favourable light can be informative and persuasive at the same time. Alternative depictions of campaign advertising will be discussed under the headings: the black box, verification, truth telling, warm glow, mendacity, and scraps of information.

1) A Black Box: For some purposes, it is reasonable to assume that campaign expenditures affect voting behaviour with no specification of how or why. That is route taken in models of "protection for sale" (Grossman and Helpman, 1994 and 1996) with emphasis on which industries buy protection and on how the price of protection is determined. Governments in office maximize the chance of reelection, balancing the gain in votes from campaign expenditure financed by the beneficiaries of tariffs against the loss of votes from the higher prices of protected goods. Specifically, the government chooses a vector of tariffs, T, to maximize its chance, G, of reelection, balancing the gain, C(T), from tariff-induced campaign contributions against the loss in popularity, W(T), from the tariffs themselves in accordance with a function such as

$$G = \theta C(T) + (1 - \theta)W(T)$$

where θ is a weighting of the two considerations.[8] Grossman and Helpman's full model has much to say about the behaviour of lobbies and governments, but contains no explanation of why campaign advertising works, no explanation of the implicit trade-off in the mind of the voter between campaign expenditures praising the virtues of the incumbent government of a party seeking office and the diminution in welfare brought about by the tariffs imposed.

2) Verification: For commercial advertising, Nelson (1970) draws a distinction between *search* qualities and *experience* qualities of information supplied by advertising. Advertising with search qualities supplies information that is true and that viewers of ads believe to be true because the sponsor of the ad would have no incentive to supply false information. "Joe's shoe store is to be found at such-and-such a place." Joe would have no incentive to falsify such information, no incentive to direct potential buyers of shoes to a grocery store instead. Viewers might be less willing to believe an ad claiming Joe's shoes to be the best in town because every shoe store has an incentive to make such claims.

Claims about quality are ubiquitous, and an ingenious reason has been suggested as to why such claims might be believed. Consider cookies rather than shoes. Suppose there are two qualities of cookies with different market prices. Every person buys one box of cookies, either high quality or low quality, a week forever. Some people buy high quality cookies because they believe the higher quality is worth the higher cost. Others are content with the low quality but less expensive cookies. Market prices of high and low quality cookies are p^H and p^L, and the cookie maker's profits per box are π^H and π^L where, of course $p^H > p^L$ and $\pi^H > \pi^L$.

Advertising enables a person who wants high quality cookies, and is prepared to pay the extra cost, to discover which brands of cookies are high quality and which are not. Trial and error would eventually be successful but might be expensive, especially if there are many more low quality brands than high quality brands. Costless advertising would be no help at all because every cookie maker would have an incentive to claim its brand to be high quality, supplying producers of low quality with a bonus of $p^H - p^L$, the difference between the prices of high and low quality cookies.

Costly advertising makes true claims believable, by causing the advertiser to lose money if they claims are false. If the advertiser`s claim is true, the buyer having experienced one box of high quality cookies continues to buy that brand cookies from then on, yielding the cookie seller a surplus S from the sale of one extra cookie per week forever. If the claim is false, the cookie seller makes an extra profit of just $p^H - p^L$, but the buyer seeking high quality cookies will never buy that brand again. The claim is verified by expenditure on advertising, A, of at least $p^H - p^L$ per new customer. As long as

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[8]Equation (1) is a modification of equation (5) in Grossman and Helpman (1994).

$$S > A > p^H - p^L$$

the advertiser gains from advertising if and only is the claim is true. This example is a simplification of the model in Milgrom and Roberts (1986) where the price of the advertised good is endogenous. Expenditure on advertising is said to be like burning money to get attention, where the expenditure is wasted unless the buyer's experience of the first unit of the good confirms that the good is high quality. "Try it. You'll like it", says the ad-man. "If you like it, you will buy more, becoming better off in the process, and I'll make more than enough money to cover the cost of the ad. If you don't like it, you'll become worse off, but I'll lose money too. It would never pay me to claim anything but the truth."

The distinction between experience and search qualities can be carried over from commercial advertising to campaign advertising. Experience qualities are invoked by Pratt (2004) in a model of elections where voters are primarily, but not exclusively, concerned about the competence of politicians, where parties know whether a candidate is competent, where voters initially do not, but where there is some chance that - quite apart from campaign advertising - voters will discover candidates' competence before voting takes place. Search qualities are invoked by Coate (2004) in a model of elections where voters are primarily concerned about the policies that parties would adopt if elected and where each party's' choice of policies can be communicated to voters truthfully and believably but at some cost. Both models allow parties to "sell" policies favourable to the suppliers of campaign funds. Both models have implications about proposed reforms of the rules for campaign advertising. Coates' model will be discussed under the heading of thuth-telling below.

Prat (2004) adopts the experience model of advertising, assuming claims in ads to be believed if and only if the advertiser would expect to lose money should its claims turn out to be false. Information in Prat's model is about competence rather than policy. In a stripped-down version of the model, there is one voter, two candidates, L and R, and two possible policies, p_1 and p_2. Everybody knows the quality of candidate R. The quality of candidate L is known to a lobby that may or may not provide campaign contributions, but is not known to the voter. The voter prefers policy p_2 to policy p_1. The lobby prefers policy p_1 to policy p_2. Candidates care about nothing other than being elected.

Two additional assumptions are introduced: First, the voter places more weight on the quality of the candidate than on policy adopted. The voter prefers a high quality candidate adopting p_1 to a low quality candidate adopting p_2. The preference is strong enough that, regardless of which policy candidate L adopts, the candidate L would win the election if he is believed to be high quality. Second, just before the voter casts his ballot, a ball is drawn from an urn with proportions ρ and $(1 - \rho)$ of yellow and green balls. If the ball turns out to be yellow, the voter is informed about the quality of the candidate L. If the ball turns out to be a green, he is not. The chance, ρ, of the voter discovering the true quality of candidate L plays a role in Prat's model that is similar to the tasting of cookies in the model of commercial advertising.

Campaign advertising is an exchange of money for favours. The lobby supplies money in exchange for a binding promise by candidate L to adopt policy p_1 preferred by the lobby rather than policy p_2 preferred by the voter. For the transaction to be mutually advantageous, the candidate L must really be high quality and the voter must see that lobby's cost of advertising is high enough that the lobby would lose money if the information were false. There must be a range of campaign expenditures within which the given ρ is high enough for the lobby to profit if and only if the candidate L is high quality. Prat shows that this may be so.

The model depends critically on the analogy between commercial and political experience. In each case, the target of advertising is told something he can verify for himself, at some cost in the case of cookies, and with some probability in the case of candidates. The main assumption in the political version of the story is the chance that the candidate's quality will be discovered *before* the election. There is some question about how closely this assumption corresponds to the circumstances of political life where the true quality of a candidate is unlikely to be discovered, if at all, until long after the election. Politicians are not cookies. "Try it. You'll like it." makes sense for cookies or even for cars where the ad is intended to direct the target to a car dealer who can supply some "experience" of the car. Politicians differ from cookies in being infrequently sampled (once every few years rather than once a week) so that their qualities are rarely discovered until it is too late to dispense with them, and because there are few moments in the ebb and flow of events when the politician's true quality is discovered.

3) Truth-telling: In Coate's model, each party's campaign advertising communicates truth about its platform, but only to the proportion, λ, of the electorate that actually sees the add, a proportion dependent on the amount of a party's campaign expenditure. Coate postulates that

$$\lambda(C_L) = C_L/(\alpha + C_L) \qquad \text{and} \qquad \lambda(C_R) = C_R/(\alpha + C_R)$$

where C_L and C_R are the parties' campaign expenditures, $\lambda(C_L)$ is the proportion of the electorate that sees the left party's ads, and $\lambda(C_R)$ is the proportion of the electorate that sees the left party's ads. The effect of campaign advertising on elections is that, for instance, when the left party chooses a certain policy and spends C_L on campaign advertising, a proportion, $\lambda(C_L)$ votes in the belief that the left party's policy is really what the left party claims it to be. Suppose all politics is about the redistribution of income as represented by the tax rate imposed, where the stalwarts of the left party favour a very high tax rate and the stalwarts of the right party favour a very low tax rate (or none at all). But for campaign advertising, all voters would assume that those are the rates which the parties, if elected, would impose. Campaign advertising is a believable promise to be more moderate. A proportion $\lambda(C_L)$ of the population believes the promises of the left party, and a proportion $\lambda(C_R)$ of the population believes the promises of the right. Campaign advertising informs voters about parties' chosen policies, and, in doing so, induces parties to choose more moderate policies - with lower taxes in the left platform and higher taxes in the right platform - than the parties would choose if they were sure to be elected regardless.

To complete the model, something must be assumed about the source of campaign funds.

The simplest assumption would be that the left and right supporters supply their own funds to maximize functions $u^L(\pi, C_L)$ and $u^R(\pi, C_R)$ where π is the left party's chance of winning the election, dependent in some complex way on promised tax rates and actual campaigh expenditures. Alternatively, campaign expenditures, C_L and C_R, may be supplied by lobbies to influence the parties choices of tax rates in their platforms. Taking the latter route, Coate derives a Nash equilibrium pair of campaign expenditures.

Prat and Coate's models have an interesting difference in policy implications. In Prat's model, public funding and legal restrictions on amounts of campaign advertising are harmful on balance because advertising verifies nothing unless the advertiser bears the cost. In Coate's model, public funding and legal restrictions on amounts of campaign advertising can be socially beneficial because true information helps voters in deciding which party they prefer, regardless of how that information is financed.

4) False Information: Campaign advertising may be false, or it may create a false impression without actually lying. Oil companies tout their green credentials or their support for small business. Within campaign advertising, lies are difficult to refute, especially after the *Citizens United* decision of the US Supreme Court allowing political action committees to conceal the sources of their funds. How does a candidate defend himself against the accusation by a political action committee that, as a soldier, he acted cowardly protecting himself against danger while endangering his comrades in arms. One can deny such charges or even sue the political action committee, but the case is unlikely to be resolved until well after the election. The accusation may have done its work if a few undecided voters are turned against the candidate or if a few people who might otherwise vote for the candidate are persuaded to abstain.

5) Warm Glow: "I'd like to teach the world to sing in perfect harmony. I'd like to buy the world a Coke and keep it company. It's the real thing....." What is that all about? It is not false. It cannot be inviting the customer to try a new product because everybody has tasted Coca-cola already. It is intended to make people feel good about drinking Coca-cola, quite apart from how it tastes or its effects on people's health. Becker and Murphy (1993) have developed a model of advertising suggesting that Coke ads and the actual bottle of Coca-cola are like inputs into a larger product which is the entire experience of drinking Coca-cola. The term "warm glow" has been used as part of an explanation of why people give to charity (Andreoni, 1989). You get a warm glow by helping others. Similarly, you may get a warm glow from the association of a memorable ad with the product you consume.

5) Persuasive advertising: Persuasive advertising inculcated belief in debatable or unverifiable propositions. "This brand of aspirin is better than that brand of aspirin." Perhaps medical research can establish the truth of such claims one way or another, but the ordinary person seeing such adds on television or in the newspaper cannot, and may be persuaded by whichever add is seen most frequently. Much campaign advertising is persuasive in this sense of the term: "Our nation's prosperity is guaranteed by the genius and magnanimity of our great leader.", "We can do it.", "Tax reduction is the only route to full employment." "That other party is the party of tax and spend.",

"Tax increases are counter-productive because they generate less rather than more revenue." This last claim is really about the location of the Laffer curve. Few would question that there must be some tax rate high enough for this claim to be true, a rate so high that any increase in the tax rate reduces the tax base more than proportionally, reducing tax revenue as well. Few would question the existence of a Laffer curve. The political question is whether tax rates are already so high that economy is on the wrong side of the Laffer curve today. "Experts" have answered the question both ways. Some say there is still plenty of room to increase tax revenue by increasing tax rates. Others say there is none. Candidates and political parties appealing to the rich claim we are already on the wrong side of the Laffer curve. Candidates and political parties appealing to the poor who benefit from public services financed by high tax rates claim that we are not. Both believe what they say, in accordance with the old quip that "it is difficult to get a man to understand something when his salary depends on his not understanding it." It is virtually impossible for the ordinary voter to get to the bottom of the matter.

Unable to analyse the data for himself, the typical voter must surely be influenced by the ads he sees. One ad asserts that higher taxes are needed to finance welfare, health care and the old age pension. Another ad asserts that higher taxes diminish employment, so that, if you want to keep your job, you had better vote for the party that keeps taxes low. Experience is at best an exceedingly vague guide for judging which claim is true. Voters may well be convinced by the ads they see. In so far as campaign advertising tends to strengthen unverifiable claims, there is every reason to expect the party with the larger expenditure to capture the larger share of the votes. Ads repeating over and over again that "Tax cuts are the path to prosperity" may well convince many voters that tax cuts are the path to prosperity.

6) Scraps of Information: Imagine an election where each voter's preference as between a left party and a right party depends, at least in part, upon which among a vast set of bits of information he is aware of and upon his weighting of each bit of information he has, and where each party's campaign advertising is intended to supply as many voters as possible with extra bits of information favourable to one party or the other and to alter people's weighting of information accordingly, raising he importance of information that is favourable to one's party or unfavourable to the opponent.

Think of all information relevant to the choice between political parties as consisting of a large number, N, of facts, each fact labelled as n from 1 to N. Let person i's party preference as v_i where $v_i > 0$ signifies that person i prefers the left party, $v_i < 0$ signifies that person i prefers the right party and strength of preference is reflected in the absolute value of v_i. Suppose party preference, v_i, depends exclusively upon the set of facts of which the voter i is aware and upon the weighting of each known fact in person i's assessment of the parties. Specifically, suppose

$$v_i = \sum_{n=1}^{N} \delta_{in} w_{in}$$

where the parameter δ_{in} is equal to 1 if person i is aware of fact n and is equal to 0 otherwise and where the parameter w_{in} is *positive* when knowledge of fact n makes person i more favourable to the *left* party, the parameter w_{in} is *negative* when knowledge of fact n makes person i more favourable to the *right* party, and the importance of fact n is reflected in the absolute value of w_{in}.

Advertising is intended to influence voters' values of δ_{in} and w_{in} . Advertising by the left party is intended to turn δ_{in} from 0 to 1, informing people of fact n as long as $w_{in} > 0$ but not otherwise. Advertising by the right party is intended to turn δ_{in} from 0 to 1, informing people of fact n as long as $w_{in} < 0$ but not otherwise. Advertising by the left party is also intended to increase all w_{in} for which $\delta_{in} > 0$, and advertising by the right party is intended to decrease all such w_{in} instead.

Campaign advertising becomes especially complicated when facts have different effects upon different people. If $w_{in} > 0$ for some people and $w_{in} < 0$ for others, the left party has an incentive to reveal or to emphasise fact n if the former group is larger or, perhaps if people in the latter group would not vote for the left party regardless. A crafty politician might reveal certain facts to some people but not to others, as when campaign donors are told that their preferences will be respected, but ordinary voters are not. Nevertheless, the more money a party spends on advertising a given fact n, the more people will be aware of it (the larger will be the size of the group for whom $\delta_{in} = 1$ rather than 0) and the larger does the absolute value of w_{in} become.

Facts may be more or less closely connected. Suppose, for example, that the left party supplies more social services and imposes higher taxes to finance them. Call these fact n* and fact n** where n* would be advertised by the left party and n** would be advertised by the right. The left party advertises to increase the number of people i for whom $\delta_{in*} = 1$ rather than 0 and to magnify the importance, w_{in*} , that voters attach to n*. Similarly, the right party advertises to increase the number of people i for whom $\delta_{in**} = 1$ rather than 0 and to magnify the importance, w_{in**} , that voters attach to n**. Ads by the left party stress compassion, but never taxes. Ads by the right party target the left party as the party of tax and spend, without being very clear about what the spending is for.

A well-endowed party can lie without actually lying. By supplying enough scraps of favourable information and by raising their apparent importance through repetition and spin, campaign advertising can create a false impression of the relative merits of two competing parties without supplying false information at all, influencing the outcome of an election in what most people would see as an undesirable way. All that is required is for campaign expenditure to be very much larger for one party than for the other. Outright deception is possible but not necessary for advertising to be effective.

8) Joining the Parade: Parties' campaign expenditures may be on advertising or to get out the vote. In an environment where as much as half of the eligible voters abstain, persuasion of a party's supporters to vote may be no less important than persuasion of people who might not otherwise vote for one's party to change their minds. The two roles of money in elections are logically distinct, but not entirely distinct in practice. The person who would vote left if he votes at all may be induced by

campaign advertising to vote rather than to abstain. Preaching to the converted makes sense in this context. Advertising in support of the left party may increase the number of votes for the left party by churning up enthusiasm rather than by changing anybody's views.

Aspects of campaign advertising discussed here - costly transmission of information, verification of claims, outright mendacity, warm glow, persuasion by repetition, demonstration of others' preferences, selective presentation of scraps of information and joining the parade - are complements rather than substitutes. One aspect of campaign advertising may be dominant in some particular case, but, typically, all have their places in campaign advertising as a whole. Ideally, all of these aspects of campaign advertising would be combined in one large model through which their relative importance can be assessed.[9] In practice, recognition of the many different routes by which campaign advertising might affect the outcome of an election may be seen as justification for the black box notion of campaign advertising (item #1 below) where each party's advertising augments its attractiveness in the eyes of the voter with no fundamental explanation of why that is so. In particular, the view of campaign advertising as provision of scraps of information is complemented by the view of expenditure on campaign advertising as increasing the number of people who get to receive the advertiser's message. Campaign advertising would then be focussed simultaneously on appropriately chosen facts and on maximizing the number of voters informed.

Effects of campaign advertising are invariably multidimensional, with positive party effects for one's own party, negative party effects for the opposition, positive policy effects on items in one's party platform and negative policy effects on the items in the platform of its opponent. In this context, radical simplification is required if anything substantive is to be said about campaign advertising in general. The procedure to be adopted in the rest of this article is to postulate that the net effect of campaign advertising on voters' opinions, to be called the advertising advantage, depends upon the ratio of their campaign expenditures, on the ratio C_R / C_L where C_R and C_L are advertising expenditures of the right and left parties. The higher the ratio of C_R to C_L, the more voters are persuaded by what the right party wants voters to believe, but there is no net effect on voters' opinions from a doubling of both parties campaign expenditures.[10]

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[9]There is some problem in generalizing the verification model from one fact to many facts. In Pratt's model, there was only one fact - whether the quality of a candidate is high or low - and the voter had a chance of getting to know the fact prior to the election. It is unclear what inference the voter can draw from campaign advertising when there are many facts to be verified, that is, when a party makes many claims to virtue and many allegations of the vices of its opponent. Regardless of a party's total expenditure on campaign advertising, how is the voter to be sure that all the party's claims are true.

[10]On this assumption, a doubling of both parties' campaign expenditure is wasted, but that need not be so if, contrary to what will be assumed for the model in this paper, each party's advertising conveys true information to the voter about, for example, the competence of its candidates.