THE CONTROL OF POLITICIANS: AN ECONOMIC MODEL*

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This paper applies economic theory to an analysis of behavior in the public sector. The model focuses on the division of interest between the public and its political representatives. The division of interest arises because the public officeholder is assumed to act to advance his own interests, and these interests do not coincide automatically with those of his constituents. The electoral process and some elements of the political structure are then analyzed as mechanisms which can be used to move the officeholder toward a position where the advancement of self-interest approximates the advancement of the interests of his constituents.

In order to facilitate the analysis of political control, the theoretical model incorporates an extremely simplified version of the underlying "public interest." In section I an assumption of common tastes on private goods versus the single type of public good insures unanimous agreement among individuals on the ideal aggregate level of governmental activity. Given this unanimity, the model abstracts from differences of opinion among the public and focuses on the problem of the public's control over its political representatives. It should be stressed that the current analysis is intended to be complementary to previous work which has focused on divergent tastes for public versus private goods.

Section II considers the behavior of the public officeholder in the absence of electoral control. A key element in this analysis is the existence of "political income," which, in a general model, would be derivable from pursuing governmental activities which favor consumer and producer interest groups. In the current model attention is limited to income which is derivable from over-payments to (competitive) factors of production. The potential for this type of income motivates the officeholder to press government expenditure beyond the level desired by the public. The important general conclusion is that the office holder, acting out of self-interest, will not automatically select activities in the public sector in accordance with the desires of his constituents.

Section III describes the operation of electoral control within the framework outlined above. The basic conclusion here is that, even with a competitive supply

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of potential officeholders, electoral control is only partially effective as a mechanism for inducing the officeholder to advance the interest of his constituents. The extent to which this control is effective turns out to depend on the potential for political income as well as on some elements of the political structure, such as the frequency of election and political salary.

Section IV considers the return to public office and suggests that the explicit salary will generally not adjust to the market-clearing level. The model views costly office-seeking activities, which result, at least in part, in a dead-weight social loss, as a response to the surplus income from public office.

Section V analyzes the optimal choice of some elements of the political structure—political salary, electoral frequency, and restrictions on length of tenure in office. The effects of these variables operate through two channels—first, in influencing the effectiveness of electoral control, and second, in affecting the amount of costly office-seeking activity.

Section VI describes some extensions to the theoretical model.

I. A Simple Model of Public Choice with No Problems of Political Control

Consider an economy with two types of goods; a private good, X, and a public good, G. Each individual receives utility from his own consumption of X and from the total amount of public output. Hence, the i^{th} individual's utility is

$$U_i = U(X_i, G).$$

An important simplification in this model[1] is that the utility function (in terms of ordinal properties) is assumed to be the same for all individuals. The purpose of this simplification is to maintain a manageable framework for analyzing some problems of political control under indirect government. It is also assumed in the model that each individual receives the same exogenous amount of real income, w, which is measured in units of X.

The production of public goods is assumed to involve a resource cost C(G), in units of X. It is useful to separate out from total cost of government the salary payment, w_p, to the officeholder (or, more generally, to the set of public officials) who administers the expenditure. At this point, the salary is treated as exogenous

[1] A similar model has been constructed by Buchanan, 1964.

and independent of G. Assuming a balanced budget, total taxes, T, are given, in units of X, by

$$T = C(G) + w_p \qquad (C'(G) > 0).$$

Taxes are assumed to be levied on an equal per-head basis; hence, the i^{th} individual's liability is

$$T_i = \frac{1}{N}(T) = \frac{1}{N}[C(G) + w_p],$$

where N is the total number of individuals, which is assumed to correspond to the number of taxpayers. Throughout this paper, the number of taxpayers is assumed fixed—in particular, this number is insensitive to changes in government tax and expenditure policy.[2]

The amount of public output which the i^{th} individual would like produced is determined from the optimization problem,

$$\begin{aligned} &\text{maximize} \quad U(X_i, G), \\ &\text{subject to} \quad w = X_i + \frac{1}{N}[C(G) + w_p]. \end{aligned} \tag{1}$$

The solution to this problem involves the equation of the utility rate of substitution between private and public goods to the marginal tax share,

$$\frac{\partial U/\partial G}{\partial U/\partial X_i} = \frac{1}{N}C'(G). \tag{2}$$

This condition and the budget constraint in equation (1) determine the i^{th} individual's optimal level of government output G* and the associated level of taxes, $T^* = C(G^*) + w_p$. Under the assumption of common tastes and equal incomes, there is no disagreement across individuals on the values of G* and T*.[3] These values of G* and T* serve as targets[4] which are not generally fully attainable under indirect government, as discussed in the subsequent sections of the paper.

[2]Tiebout (1956) argues that the sensitivity of the number of taxpayers to government policy is important when moving costs are low. It would be interesting to extend the analysis in this direction, though a satisfactory treatment would also have to consider the effects of government behavior on property values.

[3]The common choice of G* and T* can be generalized to an environment of unequal income if the utility functions remain the same across individuals and if the appropriate inequality in tax shares is introduced. As Buchanan (1964, p. 229) has shown, the general condition for unanimity in this model is that "the income elasticity of demand for the public good divided by the price elasticity of demand must be equal to, and opposed in sign to, the income elasticity of the tax-price schedule."

[4]Since G* depends on w_p in equation (1), it is useful to think of the target G* as corresponding to the competitive value of w_p, which would be w in the model of section I.

II. The Behavior of the Politician in the Absence of Electoral Control

This section considers the behavior of the public officeholder under the provisional assumption that his future status—in particular, reelection or non-reelection—is independent of his actions in office. The crucial assumption made here is that the officeholder's objective is the maximization of his own utility.[5]

Within certain limits, the officeholder is assumed to have control over the amount of public output. In a general context the limitations on this control could involve constitutional restrictions and the necessity for direct dealings with the legislature and the public. In this paper a model of indirect government is constructed in which the direct control on governmental activity involves only the requirement of a balanced budget and some limitations on the amount of excess payments that can be made to factors of production (see below). It is, however, assumed that w_p and the pattern of tax incidence are set exogenously (perhaps at the consitutional level).[6] For present purposes, tax liabilities are determined from an equal payment-per-head rule—$T_i = \frac{1}{N}(T)$. In section III it is further assumed that the administration of the electoral process and such electoral rules as the frequency of election and restrictions on length of tenure in office are outside of the officeholder's control.

The officeholder receives income in two forms. First, there is the explicit salary income, w_p. Second, the officeholder is assumed to receive an additional amount of income, subsequently referred to as political income, which depends on his activities in office. In a general model the public officeholder could derive income beyond his explicit salary by pursuing governmental activities which favor consumer and producer interest groups. Some examples of these types of income-generating activity are excess payments to factors of production, tax loopholes and income transfers, special-interest production, and favorable economic legislation.[7] In this paper the analysis is limited to political income which

[5]Similarly, Downs (1957, p. 28) assumes that politicians "act solely in order to attain the income, prestige, and power which come from being in office. . . . their only goal is to reap the rewards of being in office *per se*." However, he then argues (pp. 30-31) that this objective is equivalent to the objective of maximizing voter support. In my model electoral support enters into the problem but is not equivalent to the basic objective. In fact, the behavior of the politician described in section III emerges from weighing the gains from reelection against the gains from non-reelection. Niskanen (1971, Ch. 4) considers several alternative objectives for a bureaucrat, and ends up using the objective of budget maximization..

[6]The distinction between the constitutional and the operational level of decision-making has been stressed by Buchanan and Tullock (1962, Ch. 3).

[7]In general the income-generating potential of such activities as tax loopholes and income transfers, special-interest production, and favorable legislation would depend on the relative concentrations of the benefited and injured groups. This aspect has been stressed by Stigler (1970, 1971).

is derivable from excess payments to factors. This limitation affects the conclusions regarding the form of governmental activity, but would not seem to affect the general form of the analysis of electoral control and of political structure, which is carried out in sections III-V, below.

There are various possible forms in which political income can be transacted.[8] Two examples which fit well into the model of excess payments to factors are: (1) payments from recipients of government contracts in such forms as campaign contributions, increased business with a politician's law firm, promises of future employment, and lecture fees; and (2) provision of personal services, particularly during political campaigns, from holders of public employment. In this model political income is treated as an explicit income flow to the officeholder.[9]

The important question is the relationship between the amount of political income received from factors and the level of governmental activity. The amount of political income is determined by the amount of overpayment to factors and by the fraction of that overpayment which the officholder is able to recoup as personal income (for example, by the payment methods described above). In general, the maximum amount of factor overpayment will depend on the total production cost, which is taken to be fixed technologically at C(G), and on the nature of the public control apparatus which is designed to limit overpayment to factors. Some institutional arrangements which can limit factor overpayment are competitive bidding for public contracts and civil service "merit" systems. Since, in general, greater limitation on overpayment will require greater public expenditure in the form of information and control systems, it is itself an interesting problem to determine the optimal extent of this control. The current analysis is an input to this problem, since the results can be used to evaluate different levels of control. For the current analysis, it is assumed that, given the existing control structure, the amount of factor overpayment, denoted by Ψ, is determined as a function of the underlying cost of public production, C(G) – notationally.

$$\text{Factor overpayment} \equiv \Psi = \Psi[\,C(G)\,],$$

where $\Psi'(C) > 0$ and $\Psi(0) = 0$. It is being assumed here that differences between the actual amount and the maximum amount of overpayment can be ignored–see the discussion in n. 11, below. In some of the subsequent analysis, it is assumed that the existing control apparatus is sufficiently strict so that the fraction of public outlay which goes to factor overpayment is small–that is, $\Psi'(C) << 1$ is assumed. However, the general form of the analysis does not depend on this condition.

[8]Some examples are discussed in Stigler (1971, pp. 12-13).

[9]Some types of implicit political income, such as satisfaction from carrying out pet projects and enhanced power and prestige related to a greater volume of expenditure under the politician's control, would have a similar influence on the officeholder's behavior. However, in order to encompass these types of income, the model would have to be modified to deal with imperfect substitutability between political income and explicit salary. Different forms of political income may also have different implications for social cost.

Given the amount of factor overpayment, the amount of political income is determined by the fraction of that overpayment which the officeholder is able to recoup as net personal income. Political income will fall short of Ψ on four counts: (1) the extent that factors receive a net share of the excess payments, (2) the extent that factors expend resources in the competition for lucrative government work, (3) the extent that the officeholder expends resources in the search for receptive clients, and (4) the extent that resources are consumed in the process of transacting–in particular, in the concealment of the transacting of–political income. The first element can be eliminated by assuming a competitive supply of factors. Under these circumstances, the second and third elements may also be unimportant. In any case, to reflect the presence of the last three elements, it is assumed that net political income, denoted by Φ, is a postive, but less than one-to-one, function of Ψ. Since Ψ is itself a positive function of C(G), it follows that

$$\text{Political income} \equiv \Phi = \Phi[C(G)],$$

where $0 < \Phi'(C) < \Psi'(C)$ and $\Phi(0) = 0$. It is assumed that the marginal effect of C on Φ diminishes as C rises–that is, $\Phi''(C) < 0$. This condition can reflect either the increasing difficulty of concealing additional political income as the total amount of political income rises, or the working of the control apparatus to achieve a greater limitation on additional factor overpayment as the total amount of overpayment rises. It is also implicitly assumed in the maximization below that the combination of these two forces is sufficiently strong so that the marginal contribution of C to political income, $\Phi'(C)$, becomes negligible at a sufficiently high value of C.

Assuming a balanced budget, total taxes are now given by[10]

$$T = C(G) + \Psi(C) + w_p = C(G) + [\Psi(C) - \Phi(C)] + \Phi(C) + w_p. \qquad (3)$$

The positive term, $[\Psi(C) - \Phi(C)]$, corresponds to the portion of factor overpayment which is not recouped as net income by the officeholder. Given the assumption that none of this portion of the overpayment is reflected as a net increase in factor income, this amount constitutes a dead-weight social loss.

[10]This expression neglects the resources which are expended in the public control of factor overpayments. Any costs of this type would add to the term, $[\Psi(C) - \Phi(C)]$, as an element of dead-weight social loss.

The politician's utility depends on his own consumption of private goods, X_p, and on the amount of public output—that is,

$$U_p = U(X_p, G).$$

The utility function is assumed to be identical to that of non-politicians. Therefore, although the officeholder is assumed to be totally self-interested, he does reflect the interest of his constituents in the sense of sharing their common tastes for public versus private goods. Assuming that the officeholder also assumes his per-head share of the tax burden, $T_p = (1/N)T$, he will choose G to maximize U_p subject to his budget equation,

$$\Phi(C) + w_p = X_p + (1/N)[C(G) + \Psi(C) + w_p]. \tag{4}$$

Hence, treating w_p as exogenous, the officeholder's choice of public output, denoted by $\hat{G}$, is determined from the marginal condition,

$$\frac{\partial U/\partial G}{\partial U/\partial X_p} = \frac{1}{N} C'(G)\,[1 + \Psi'(C) - N\Phi'(C)]. \tag{5}$$

This condition, together with the politician's budget constraint in equation (4), determines $\hat{G}$, and therefore also determines the amount of factor overpayment, $\hat{\Psi} = \Psi[C(\hat{G})]$, the amount of political income $\hat{\Phi} = \Phi[C(\hat{G})]$, and the amount of taxes, $\hat{T} = C(\hat{G}) + \hat{\Psi} + w_p$.[11] If the politican's total income, $\hat{\Psi} + w_p$, is the same as (or higher than, assuming that G is a normal good) the income in the civilian occupation, w,[12] it is apparent from equations (5) and (2) that the office holder will select a value of G that exceeds the publicly-desired level.[13] That is, since the officeholder subtracts the marginal contribution of G to political income from his share of marginal cost of public production, he is motivated to overextend public sector activity.

[11] The current analysis does not distinguish between the maximum and the actual factor overpayment. In fact, the constraint on the politician is $\hat{\Psi} \leq \Psi[C(G)]$. This consideration implies that the interior maximization condition in equation (5) is subject to the inequality condition, $(1/N)\,\Psi'(C) < \Phi'(C)$—that is, the marginal effect of C—through factor overpayment—on the politician's own tax burden must be less than the direct effect on political income. If this condition is satisfied at $C(\hat{G})$, the politician will, in fact, set $\hat{\Psi} = \Psi[C(\hat{G})]$—that is, equal to the maximum overpayment at the given level of C.

[12] A competitive supply of homogeneous labor to the two occupations—politician and non-politician—would insure an equality in income, at least in the relevant long-run sense. See the analysis in section IV, below.

[13] Because of the overpayment to factors, the marginal cost of public production in equation (2) would now be $\frac{1}{N}\,C'(G)[1 + \Psi(C)]$, assuming that all of $\Psi(C)$ were viewed as net social cost. See section IV, below.

It should be stressed here that the officeholder's behavior depends on the form of the political income function—in particular, on the assumption that this income can be generated only through overpayments to factors. If such interest group activities as tax loopholes and income transfers, special-interest production, and economic legislation were introduced, there would be other aspects in which the activity of the officeholder would diverge from the (general) desires of his constituents. However, this extended model may also introduce some complications concerning divergent interests among the public.[14] For the purpose of analyzing the workings of electoral control and the effects of some political structure variables in the next section, it seems useful to abstract from these additional complications and to focus on a model which permits unanimity among the public and which involves only one dimension of disagreement between the public and its political representatives—namely, the level of G.

III. The Workings of Electoral Control

The public officeholder is now assumed to be subject to periodic elections. The incumbent officeholder is assumed to have no control over the conduct of these elections—in particular, the electoral frequency and any eligibility criteria for candidates are determined exogenously—for example, at the constitutional level.[15] In evaluating a candidate at these elections, individuals are assumed to be concerned only with the amount of public spending and associated taxes that the candidate would enact while in office. In particular, candidates are viewed as identical with respect to political income functions.[16] Since there is only one type of public good and since the incomes, tax shares and tastes are the same for all individuals, there is no difference of opinion in evaluating alternative programs of government expenditures and taxes. Basically, the public is faced with a situation where the politician, once in office, would like to produce $\hat{G}$ which differs from G^*. The electoral process is an instrument which, through the threat of non-reelection, can

[14]This complication does not arise in the current model, since factors of production are competitive and do not end up with any net increase in their income. Alternatively, unanimity could be preserved by assuming that, *ex ante*, all individuals viewed themselves as equally likely to share in the excess factor payments.

[15]Since the conditions for unanimity are met in this model, there is no need to specify any additional rules for the voting process.

[16]Hence, there is assumed to be no perceived differential with respect to political connections or "honesty," which would affect the Φ function. The model can be utilized to consider the extent to which an individual who refuses to accept any political income will 1) find it advantageous to enter politics, and 2) be at a financial disadvantage once he is in office. Some related aspects on the benefits of "immorality" in politics have been discussed by Buchanan and Tullock (1962, p. 303). Niskanen (1971, Ch. 17) has stressed the idea that honest government has very little to do with good government.

be used to induce the officeholder to select a value of public output which is closer to G^*. In the current model where $G^* < \hat{G}$, the electorate can use this instrument by specifying a control level $\bar{G}$,[17] where $\bar{G} < \hat{G}$, such that the incumbent is reelected if $G < \bar{G}$, and is not reelected if $G > \bar{G}$. The optimal choice of $\bar{G}$ depends on the officeholder's reaction to different levels of this control. For a given value of $\bar{G}$, the officeholder would have two options:

I) Non-reelection, in which case his optimal amount of public output during the current term is $\hat{G}$, which yields political income of $\hat{\Phi} = \Phi[C(\hat{G})]$, or

II) Reelection, in which case his optimal amount of public output during the current term is $\bar{G}$, which yields political income of $\bar{\Phi} = \Phi[C(\bar{G})] < \hat{\Phi}$.

The officeholder evaluates the two options by comparing the alternative utility flows. The analysis is much simplified if, as an approximation, the comparison can be carried out in terms of the present values of the two alternative income steams.[18] Making this approximation, the comparison depends on the values of some parameters which have yet to be specified: (1) The time interval between elections, which is denoted by τ. (2) The total amount of time which the politican is considering spending in the political office (the political horizon), which is denoted by h.[19] It is assumed that $h/\tau = n$, where n is an integer—that is, the politician does not consider the abandonment of office in mid-term. If there is an exogenous (say, constitutional) constraint to a maximum of m terms in office, then $n = m$ when this constraint is effective. Restrictions on direct succession are basically similar to reductions in h. (3) The politician's pay in an alternative civilian occupation, which is assumed to be w, the general level of income for non-politicians. (4) The politician's discount rate, r, which is assumed to be constant over time.

Consider first a politician who is planning to retire at the end of the current term—that is, $h/\tau = n = 1$. Clearly, the threat of non-reelection is of no concern to such a politician. Hence, within the current model, his optimal policy for the

[17] At this point, the control could equivalently be expressed in terms of taxes as $\bar{T} = C(\bar{G}) + \Psi[C(\bar{G})] + w_p$. A dynamic difference between the tax control and the public output control could emerge in a model where C(G) shifts over time and where the public becomes aware of these shifts only gradually. For example, the short-run effect of an inter-government grant would be different if the public looked directly at taxes and did not realize immediately that C(G) has shifted downward by the amount of the grant.

[18] This approximation neglects the officeholder's own concern about overproduction of public goods.

[19] More realistically, the relevant horizon should include at least some portion of the time which the politician wishes to spend in other political offices. Further, the existence of political parties may have the effect of raising h—see below.

current term will be to set $G = \hat{G}$ and therefore to obtain a total income of $\hat{\Phi} + w_p$. The basic difficulty here is that there is no mechanism in the model for control over lame-duck officeholders. One possible mechanism, which has been suggested in context of controlling enforcers by Becker and Stigler (1972, section 3) is to institute a pension scheme (or some other scheme of contingent prizes) which is contingent on "adequate" performance during the final term of office. It seems plausible that one function of political parties is, in fact, to provide such a mechanism of control—for example, through appointments (based on previous performance) for ex-officeholders. However, for the present analysis, this type of control is not introduced and it is therefore supposed that $\hat{\Phi} + w_p$ is the politician's income during his final term.[20]

Consider now the situation of an officeholder who would like to be reelected for just one additional term—that is, n = 2. Under non-reelection, the officeholder receives $\hat{\Phi} + w_p$ for the current term of length τ, and—not having been reelected—the alternative pay, w, for the next period of length τ. The present value of the income associated with non-reelection, over the horizon of length $h = n\tau$, is then

$$PV_I = (\hat{\Phi} + w_p)\left(\frac{1-e^{-r\tau}}{r}\right) + we^{-r\tau}\left(\frac{1-e^{-r\tau}}{r}\right).$$

Suppose that the electorate sets the reelection control at $\bar{G}(2)$, where the 2 in parentheses denotes the number of terms which the officeholder would like to serve. Suppose that the associated political income is $\bar{\Phi}(2)$. The politician who opts for reelection will then receive $\bar{\Phi}(2) + w_p$ over the current term of length τ and—having been reelected—will receive $\hat{\Phi} + w_p$ over the next term of length τ. The present value associated with relection is therefore

$$PV_{II} = (\bar{\Phi}(2) + w_p)\left(\frac{1-e^{-r\tau}}{r}\right) + (\hat{\Phi} + w_p)e^{-r\tau}\left(\frac{1-e^{-r\tau}}{r}\right).$$

The politician will opt to be reelected and will therefore set $G = G(2)$ when $PV_{II} > PV_I$— that is, after rearranging terms, when

$$\hat{\Phi} - \bar{\Phi}(2) < e^{-r\tau}(\hat{\Phi} + w_p - w). \tag{6}$$

[20]Even with a scheme of control based on pensions or future appointments it is clear that the effective income to the politician during the last term cannot be less than $\hat{\Phi} + w_p$. The more interesting aspect of the control is that it would change the value of G which is chosen by the officeholder during his final term.

In order to opt for reelection, the politician's loss in income during the current term—$\hat{\Phi} - \bar{\Phi}(2)$—must be less than the loss during the next term from not being reelected—$\hat{\Phi} + w_p - w$ discounted by $e^{-r\tau}$, since this loss applies to a period which is advanced by a time τ into the future.

The question immediately arises as to whether any value of $\bar{G}(2) < \hat{G}$ ($\bar{\Phi}(2) < \hat{\Phi}$) is consistent with the politician's opting for reelection. From condition (6), the necessary condition is $\hat{\Phi} + w_p > w$—that is, the total potential income from public office must be attractive in the first place, in the sense of being superior to the alternative income. Subject to the condition, there is room for electoral control in the sense that values of $\bar{G}(2) < \hat{G}$ exist which satisfy condition (6).

Consider now the choice of the optimal value of $\bar{G}(2)$ when $\hat{\Phi} + w_p > w$ applies. As $\bar{G}(2)$ is reduced below $\hat{G}$, $\Phi(2)$ falls below Φ and the loss from reelection, which appears on the left side of condition (6), rises. However, as long as this loss remains below that from non-reelection, which is given on the right side of condition (6), the politician would still opt for reelection. A sufficient reduction in $\bar{G}(2)$ would raise the left side sufficiently to equal the right side. At this point, the politician would be just indifferent between the two options, and a further reduction in $\bar{G}(2)$ would cause him to opt for non-reelection—that is, to produce public goods at level $\hat{G}$. Clearly, it will be non-optimal for the electorate to set its control below this balancing level. Therefore, if this level of $\bar{G}(2)$ is still above the target, G^*,[21] the optimal control policy will be to set $\bar{G}(2)$ marginally above this level so as to just induce the politician to accept reelection by producing at level $\bar{G}(2)$.[22] The case where the balancing level of output is still above G^* determines an interior solution for $\bar{G}(2)$ which is given by

$$\bar{\Phi}(2) \approx \hat{\Phi}(1-e^{-r\tau}) + (w - w_p)e^{-r\tau} \qquad (7)$$

The equality is approximate since $\bar{G}(2)$ would actually be set so that $\bar{\Phi}(2)$ exceeds the right side of equation (7) by a small amount. The allowable amount of political income, as determined in equation (7), is a weighted average of the maximum income, $\hat{\Phi}$, and the differential between alternative pay and explicit political salary, $w - w_p$. Since $\hat{\Phi} + w_p > w$ was assumed above, it follows that $(w - w_p) < \bar{\Phi}(2) < \hat{\Phi}$—that is, the total current income from office, $\bar{\Phi}(2) + w_p$, is greater

[21] The relevant target differs somewhat from the value of G^* derived in section I because of the overpayment to factors. However, when $\Psi'(C) << 1$, the difference turns out to be negligible. See section V, below.

[22] Even if $\Phi[C(G^*)] + w_p \geqslant w$ and there is a competitive supply of potential officeholders, the existence of the finite, uncontrolled period τ implies that $G(2)$ will generally exceed G^*. This conclusion would be modified if campaign promises were relevant—for example, if these promises were binding as legal contracts.

than the alternative pay, w, but less than the maximum income, $\hat{\Phi} + w_p$. Increases in $\hat{\Phi}$ or in $(w - w_p)$ raise $\bar{\Phi}(2)$ and therefore raise $\bar{G}(2)$. An interpretation of the salary effect is that an increase in $w - w_p$ reduces the loss from not being reelected on the right side of equation (6), which implies that a higher current political income, $\bar{\Phi}(2)$, is needed to motivate reelection. Since $\hat{\Phi} + w_p > w$, it also follows from equation (7) that an increase in τ raises $\bar{\Phi}(2)$ and $\bar{G}(2)$. The reasoning here is that an increase in τ reduces the loss from non-reelection, since this loss is discounted on the right side of equation (6) by $e^{-r\tau}$. Accordingly, the politician requires a greater current political income, $\bar{\Phi}(2)$, in order to continue opting for reelection. A shift in the Φ function has an ambiguous effect on $\bar{G}(2)$. A downward shift in this function implies a reduction in the current political income which is needed to motivate reelection—that is, $\bar{\Phi}(2)$ decreases from equation (7). However, since the Φ function has shifted downward, the lower value of $\bar{\Phi}(2)$ need not be associated with a lower value of $\bar{G}(2)$. From equation (7), it follows that a purely proportional downward shift in the Φ function will lower $\bar{G}(2)$ if and only if $w_p > w$.

The interior solution described in equation (7) applies only when the implied value of $\bar{G}(2)$ is at least as large as G^*—that is, only when $\bar{\Phi}(2) > \Phi^* = \Phi[C(G^*)]$. When the value of $\bar{\Phi}(2)$ determined from equation (7) is below Φ^*, the indication is that the politician would accept reelection even with a current political income below Φ^*. However, since the electorate does not desire to drive G below G^*, $\bar{G}(2)$ would actually be set equal to G^* in this situation (see n. 20, above). Hence, the politician would, in this case, be receiving a certain excess of current political income over the amount which would be necessary to motivate reelection. For given values of the other parameters, the position of $\bar{\Phi}(2)$, as determined in equation (7), relative to Φ^* depends on w_p. In particular, a sufficiently low value of w_p can always insure $\bar{\Phi}(2) \geqslant \Phi^*$, in which case $\bar{\Phi}(2)$ and $\bar{G}(2)$ would be determined from the interior solution in equation (7) and no "excess" of political income would accrue to the politician. It turns out that the optimal public choice of w_p (perhaps determined at the constitutional level) will always be such that this interior solution applies, unless negative values of w_p are excluded. The choice of an optimal value for w_p is considered in section V, below.

Consider now the general situation where the politician would like to serve n terms of office (including the current one), where $n \geqslant 2$. For non-reelection the present value over the horizon $h = n\tau$ is

$$PV_I = (\hat{\Phi} + w_p)\left(\frac{1-e^{-r\tau}}{r}\right) + we^{-r\tau}\left(\frac{1-e^{-(n-1)r\tau}}{r}\right). \quad (8)$$

The alternative pay, w, is now received over the period from τ to $h = n\tau$.

The present value from reelection is

$$PV_{II} = (\frac{1-e^{-r\tau}}{r}) [(\bar{\Phi}(n) + w_p) + e^{-r\tau}(\bar{\Phi}(n-1) + w_p) + \ldots$$

$$+ e^{-(n-2)r\tau}(\bar{\Phi}(2) + w_p) + e^{-(n-1)r\tau}(\hat{\Phi} + w_p)],$$

where $\bar{\Phi}(i)$, for $i = 2, \ldots, n$, is the allowable political income with i terms remaining to the horizon. As before, $\hat{\Phi}$ is the political income received in the last term. Suppose that $\bar{\Phi}(i)$ has been set optimally by the electorate for $i = 2, \ldots, n-1$.[23] In this case there must, in particular, be an equalization of the present values from the reelection and non-reelection options corresponding to (n-1) terms remaining. The relevant condition for equal present values with (n-1) terms remaining is

$$(\hat{\Phi} + w_p)(\frac{1-e^{-r\tau}}{r}) + we^{-r\tau}(\frac{1-e^{-(n-2)r\tau}}{r}) =$$

$$(\frac{1-e^{-r\tau}}{r})[\bar{\Phi}(n-1) + w_p) + e^{-r\tau}(\bar{\Phi}(n-2) + w_p)$$

$$+ \ldots + e^{-(n-3)r\tau}(\bar{\Phi}(2) + w_p) + e^{-(n-2)r\tau}(\hat{\Phi} + w_p)].$$

Hence, PV_{II} with n terms remaining can be simplified to

$$PV_{II} = (\frac{1-e^{-r\tau}}{r}) [(\bar{\Phi}(n) + w_p) + e^{-r\tau}(\hat{\Phi} + w_p)] +$$

$$(\frac{1-e^{-(n-2)r\tau}}{r}) we^{-2r\tau}.$$

The political income, $\bar{\Phi}(n)$, would now be set to equate PV_{II} to PV_I.[24] The solution is identical to that obtained for n = 2 in equation (7)—that is,[25]

[23] This approach is essentially one of dynamic programming, and has been used in a similar context by Becker and Stigler (1972, section 3).

[24] It is assumed here that the value of $\bar{G}(n)$ corresponding to the equating of PV_{II} to PV_I is at least as large as G^*. That is, the discussion here is limited to the interior solution for $\bar{G}(n)$—see the discussion of $\bar{G}(2)$, above.

[25] The analysis can be extended to situations where $\hat{\Phi}$, w_p and w are expected to vary over time. In particular, the higher the anticipated growth rates of $\hat{\Phi}$ and w_p relative to w, the more effective the current electoral control in the sense that the levels of $\bar{\Phi}(n)$ and $\bar{G}(n)$ are lower. In other words for given current values of $\hat{\Phi}$, w_p and w, electoral control is more effective when non-reelection entails the exclusion from (relatively) more lucrative higher-level office.

$$\bar{\Phi}(n) = \hat{\Phi}(1-e^{-r\tau}) + (w - w_p)e^{-r\tau} \quad . \tag{9}$$

Hence, as long as $n \geqslant 2$ (and $\hat{\Phi}$, w_p and w are constant over time—see n. 25, above), the amount of political income during ther current term, $\bar{\Phi}(n)$, and the associated output, $\bar{G}(n)$, are independent of the remaining number of terms which the officeholder plans to serve. However, when n = 1 the political income, $\bar{\Phi}(1) = \hat{\Phi}$, and the associated output, $\bar{G}(1) = \hat{G}$, are higher than those for all $n \geqslant 2$. This aspect of the final term in office implies that, in evaluating alternative non-incumbent[26] candidates, the electorate would prefer the candidate with the longer horizon, since this choice would lead—over time—to a less frequent occurrence of lame-duck officeholders. However, this source of preference for a longer political horizon depends on the absence of a mechanism for controlling officeholders during their final term (see the discussion above and in section V, below).

In the subsequent discussion the index n, which refers to the planned number of terms remaining, is suppressed when referring to $\bar{\Phi}$ and $\bar{G}$. The assumption that $n \geqslant 2$ is implicit.

IV. The Return to Public Office

Suppose that the current level of public output is determined according to the solution for $\bar{G}$, which appears in equation (9). In this situation the officeholder receives the total current income stream, $\bar{\Phi} + w_p$. The amount of surplus income, denoted by v, is the difference between this total income and the alternative income stream, w. Using equation (9), the surplus income can be calculated as[27]

$$v = \bar{\Phi} + w_p - w = (1-e^{-r\tau})(\hat{\Phi} + w_p - w). \tag{10}$$

[26] In a choice between an incumbent and and a non-incumbent candidate, a decision based on relative horizons could be inconsistent with the control of incumbents based on past performance (that is, based on the level of G over the previous term in the above analysis). In a more general model it could be possible to consider multiple criteria for electoral choice. However, to the extent that the electorate considers relative horizons on other current characteristics of candidates, it is clear that the control over performance, *per se*, will be lessened.

[27] The lump-sum value of office is the present value of the surplus income, v, as given in equation (10), over the first (n-1) terms, plus the present value of the surplus income, $\hat{\Phi} + w_p - w$, during the n^{th} term. This lump-sum value, V, can be determined as

$$V = \frac{(1-e^{-r\tau})}{r}(\hat{\Phi} + w_p - w) .$$

The constant income flow over time h (that is, over the full n terms) which would yield a present value equal to V is

$$\left(\frac{1-e^{-r\tau}}{1-e^{-rh}}\right)(\hat{\Phi} + w_p - w),$$

which is above v when $h < \infty$, because the surplus income during the last term is above that in previous terms. Since the importance of the finite horizon in this model hinges, at least in part, on the lack of control over the final term of office, it seemed more useful to concentrate on the surplus income during the first (n-1) terms, as given in equation (10).

The amount of surplus income increases with $(\hat{\Phi} + w_p - w)$, which was earlier assumed to be positive. The relationship between v and $(\hat{\Phi} + w_p - w)$ is less than one-to-one because of the working of electoral control in equation (9). It also follow from equation (10) that v increases with τ.

When $v > 0$, there is an excess supply of persons who would be willing to assume public office—in fact, a large group of persons who would be willing to pay a positive sum for the privilege. The question is, what mechanism, if any, resolves the excess supply and produces an "equilibrium"? A natural possibility is that the explicit political salary, w_p, moves to clear the market. In this simple model, which does not distinguish individuals according to "productivity" in public office or according to alternative earnings or occupational tastes, w_p would have to adjust to obtain $v = 0$; hence the market-clearing salary is

$$w_p^e = w - \hat{\Phi}.$$

There are two principal problems involved with w_p moving to clear the market. First, there is no guarantee, or even a reasonable presumption, that w_p^e is non-negative. Since $\hat{\Phi}$ may plausibly be several times as large as w, it is likely that the office would have to be auctioned off in order to clear the market. Secondly, even if negative salaries are admitted or if the market-clearing salary is non-negative, the setting of w_p to clear the market will not generally be optimal from the viewpoint of the public. The salary of public officials is one element of public outlay and, in this respect, the public is motivated to keep these salaries as low as possible (abstracting here from the possibility that a higher salary might attract more "able" persons to public office). On the other hand, w_p is also one of the elements which feeds into the electoral control problem—in particular, a lower value of w_p implies, according to equation (9), that a higher value of $\overline{G}$ will be required to induce the politician to accept reelection. In fact, if w_p is set low enough to reach w_p^e, the efficacy of electoral control would vanish, since $w_p = w_p^e = w - \hat{\Phi}$ implies, from equation (9), that $\overline{G} = \hat{G}$. Since a higher political salary increases the effectiveness of electoral control, the public will generally be willing to pay a salary which is above the minimum level which is necessary to attract people to public office. The determination of the optimal political salary is considered in section V.

Suppose, for the reasons cited above or for other reasons, that w_p is such that v, as given in equation (10), is positive. In this situation considerable competition can be expected among political aspirants to attain public office. Hence, there is motivation to engage in costly office-seeking activities which, in a general model, would include campaigning at election times and various day-to-day activities of

political organizations. The extent to which this activity removes the surplus from public office would depend on the conditions which affect entry into the political industry.[28] Because the present simplified model treats all potential officeholders as identical, the model would have to be enlarged to permit a satisfactory treatment of office-seeking activity. In particular, some role for political information would have to be introduced.[29] For present purposes, the relevant consideration is the extent to which the electorate views the surplus to public office, as given in equation (10), as a net subtraction from individual disposable income. Total taxes can be written, using equations (3) and (10), as

$$T = C(G) + [\,\Psi(C) - \Phi(C)\,] + w + v. \tag{11}$$

Given G and w, equation (11) indicates a one-to-one relationship between v and T. However, in general, an increase in v will reduce the disposable incomes of individuals on a less than one-to-one basis. First, to the extent that the political industry is not fully competitive, an increase in v may be reflected as an increase in the income of some individuals—that is, those individuals who own the monopoly rights in the political industry. Secondly, to the extent that the competition for public office involves transfer payments—for example, in the form of vote-buying—an increase in v may again be reflected as an increase in the income of some individuals. Finally, to the extent that office-seeking activity—for example, in the form of political campaigning—provides entertainment value or (socially) useful information,[30] an increase in v may involve an increase in the benefits to individuals. For the purpose of analyzing some political structure variables in the next section, these offsets to the one-to-one relationship between v and T, as shown in equation (11), are neglected. This situation would apply to a perfectly competitive political industry in which the activities which exhaust the surplus to public office involve the expenditure of real resources and do not convey any social

[28]With the existence of political parties, the conditions for entry would be affected, among other things, by the treatment of minority parties by the legal system.

[29]Some aspects of political information are discussed in Downs (1957, part III), and in Tullock (1967, Ch. 1).

[30]In a different context Hirshleifer (1971) has stressed the point that information which is privately useful may not be useful in a social sense. The closer elections are to a zero-sum game, the smaller the social value of information about competing candidates. Hence, one could construct a competitive political model in which each candidate correctly believes that, for a given level of his opponents' activity, he can attract additional votes by expending more resources on the provision of (privately) useful political information; but in which the aggregate expenditure for the production of political information constitutes a dead-weight social loss.

benefits.[31,32] The qualitative conclusions in the next section would not be altered if it were assumed instead that an increase in v reduced disposable incomes on a less than one-to-one basis.

V. *The Impact of Some Political Structure Variables*

Given the electoral control policy which was discussed in section III, there are three elements of social "inefficiency" which characterize the political process. First, the amount of public output chosen by the politician differs from that which would be chosen directly by the public—that is, $\bar{G} > G^*$ in equation (9). Second, there is the dead-weight loss corresponding to the factor overpayment which is not recouped as net political income—that is, the term, $\Psi - \Phi$, in equation (11). Finally, there is the dead-weight loss from office-seeking activity, which is assumed to correspond to the full surplus income from office, v, as given in equation (10).[33] The amounts of the three inefficiencies depend on some aspects of the political structure which may be subject to public control (for example, at the constitutional level). This section discusses the optimal choice of political salary, electoral frequency, and restrictions on length of tenure in office.

[31] It should be noted that an increase in electoral frequency—that is, a fall in T in equation (10)—leads to a decrease in v, and therefore to a decline in the amount of competitive office-seeking activity. This conclusion conflicts with the popular view that more frequent elections will lead to a greater amount of wasteful political activity. Assuming that the amount of office-seeking activity is determined by the value of the objective of that activity, the popular view must be incorrect. In section V the analysis is extended to include also the direct administrative costs of holding elections.

[32] In order to preserve the exact form of electoral control which was constructed in section III, it is also necessary to assume that the officeholder's total expenditure on office-seeking activity occurs before or during his first term in office. Any costs which were incurred during subsequent terms would affect the officeholder's weighing of the reelection and non-reelection options and would therefore change the value of $\bar{G}$, as determined in equation (9). The neglect of costs during subsequent terms can be rationalized by observing that office-seeking costs may involve investments in political capital over a long period before the initial term in office. These investments could take the form of service to a political party or they could involve the acceptance of lower level public offices which were not desirable for their own sake. Any advantages of the incumbent in electoral campaigns would also support this assumption.

[33] See n. 27, above.

Political Salary

An increase in w_p affects the three types of social costs in the following ways. The dead-weight income loss from office-seeking activity, v, as given in equation (10) increases. However, because an increase in w_p increases the effectiveness of electoral control, the amount of public output as determined in equation (9) decreases. Since G falls, and since $\Psi'(C) > \Phi'(C)$, the amount of unrecouped factor overpayment, $\Psi - \Phi$, also falls. In evaluating these effects of an increase in w_p, individuals are concerned with the ultimate impact on utility, $U_i = U(X_i, G)$, which depends in turn on the effect of w_p on X_i and G. The negative effect of w_p on G can be determined directly from equation (9). The effect of w_p on X_i can then be determined by utilizing the expression for total taxes in equation (11), together with the individual budget equation, $X_i = w - (1/N)T$. Since G and therefore C(G) decrease with w_p, while v increases (equation (10)), the net effect on T and therefore on X_i is uncertain. However, if it is assumed that the relationship between the costs of public production and factor overpayment is much less than one-to-one—that is, $\Psi'(C) << 1$ —[34] then it is guaranteed that the change in the dead-weight income loss from office-seeking activity, v, will be small relative to the change in the cost of public production, C(G). In this case X_i will unambiguously increase with w_p. Accordingly, political salary can be viewed as an instrument which, given the electoral control described by equation (9), can be utilized to effect a certain rate of substitution between private and public goods. Further, since changes in C(G) are assumed to dominate over changes in Ψ and v, this attainable trade-off between X_i and G approximates that which was assumed to be available in the idealized model which was constructed in section I.[35] Accordingly, the optimal political salary, denoted by w_p^*, is that value which motivates the officeholder to produce public goods at (approximately) the target level G^*.[36] The amount of public output that the officeholder will actually select as a function of w_p is determined from the electoral control condition, which is given in equation

[34] The condition, $\Psi'(C) << 1$, guarantees that the major potential social cost of indirect government in this model is the improper choice of G, and not the dead-weight losses which correspond to $\Psi - \Phi$ and to v.

[35] The rate of substitution between X_i and G which is attainable through changes in w_p can be calculated from equations (9) - (11) as

$$\frac{dX_i}{dG} = -\frac{1}{N}C'(G)\left[1 + \Psi'(C) - e^{r\tau}\Phi'(C)\right].$$

[36] This conclusion is approximate in the sense of the rate of substitution between X_i and G which is calculated in n. 35, above, and also in the sense of neglecting the negative income effect which is associated with the presence of $\Psi - \Phi$ and v.

(9). Since w_p^* must be such that $\bar{G} \approx G^*$ and hence that $\bar{\Phi} \approx \Phi^*$, the approximate condition for determining w_p^* is, after rearranging terms,[37]

$$w_p^* \approx w + \hat{\Phi}(e^{r\tau} - 1) - \Phi^* e^{r\tau}. \tag{12}$$

The implied value of w_p^* will be below w unless τ is very long or the ratio, $(\hat{\Phi}/\Phi^*)$, is very high. For example, if r = .05 per year, then if τ = 4 years, w_p^* is below w unless $(\hat{\Phi}/\Phi^*) > 5.5$. For τ = 2 years, w_p^* is below w unless $(\hat{\Phi}/\Phi^*) > 10.5$. If w is itself small relative to $\hat{\Phi}$ and Φ^*, then the value of w_p^* indicated in equation (12) is likely to be negative. However, it can be verified from equation (12) that w_p^* is, in any case, above the market-clearing salary, $w_p^e = w - \hat{\Phi}$.[38] Corresponding to the excess of w_p^* over w_p^e, there is a dead-weight income loss from office-seeking activity, which can be shown to be a positive function of $(\Phi - \Phi^*)$ and τ. The dead-weight loss associated with the unrecouped factor overpayment is fixed at $\Psi[C(G^*)] - \Phi^*$.

Frequency of Election

Consider now the effect of a change in τ for a given value of w_p, where w_p is not necessarily equal to w_p^*. A reduction in τ, which corresponds to an increase in electoral frequency, reduces public output according to equation (9) and also reduces the dead-weight loss from office-seeking activity according to equation (10). Hence, if τ could be reduced costessly, the optimal value would be $\tau = 0$—that is, a continuous review process by the electorate.[39] Suppose instead that the administrative cost of elections (which includes the time required of the public) is positive and is basically a lump amount. That is, some cost γ, in units of X, must be paid each time an election occurs, where γ is treated as a constant independent of τ. This electoral administration cost represents another type of dead-weight income loss. If all costs were explicit charges paid by the government, then taxes, as given

[37] If $\hat{\Phi}$ rises with "experience" in office, w_p^* would also rise with the number of years already served. Hence, in this case, there is a rationale for a seniority premium, from the viewpoint of optimal control.

[38] This conclusion would seem to apply to any position of employment which meets the following two conditions: 1) the position permits the acquisition of some amount of "unofficial" income, and 2) the process of collecting this income by the employee entails a greater than one-to-one cost (given the explicit salary) on the employer. In the political case considered in this paper it is principally the connection between G and Φ which entails the extra cost and therefore motivates the public to pay an "excessive" salary. However, it would be possible to recoup the excess salary payment by charging a lump-sum fee upon the entrance to office. In this respect see Becker and Stigler (1972, section 3).

[39] Actually, for a given value of w_p, there is no additional gain from setting τ below the value which would equate $\bar{\Phi}$ to Φ^* in equation (9).

in equation (11), would now include the additional flow term, $(r\gamma)/(1-e^{-r\tau})$. To the extent that γ involves the loss of the electorate's time, the situation would be somewhat more complicated and a charge for this time would have to be entered as a subtraction from the (full) income of individuals. Since, in any case, the charge represents a subtraction from personal income, no substantive differences are involved.

When $\gamma > 0$, reductions in τ involve a trade-off since the favorable effects described above are offset by a direct increase in administrative costs. As in the case of changes in w_p, one can calculate the rate of substitution between X_i and G which is obtainable through changes in τ. Again, if $\Psi'(C) << 1$, it turns out (assuming reasonable magnitudes for γ) that τ should be selected, for a given value of w_p, so that $\overline{G} \approx G^*$. From equation (9), this value of τ, denoted by τ^*, will satisfy the condition,[40]

$$e^{r\tau^*} \approx \frac{\hat{\Phi} + w_p - w}{\hat{\Phi} - \Phi^*} \tag{13}$$

Hence, τ^* increases with Φ^* and $w_p - w$, and falls with $\hat{\Phi}$. If $w_p \approx w$, then the optimal election period is shorter than 4 years only if $\hat{\Phi}/\Phi^* > 5.5$. However, if w_p is much less than w (which may well be optimal, see below), the optimal election period could be shorter than 4 years.

The corresponding amount of dead-weight income loss from office-seeking activity plus the cost of administering elections can be determined from equations (10) and (13) as

$$v(\tau^*) + \frac{r\gamma}{1-e^{-r\tau^*}} = \Phi^* + w_p - w + r\gamma\left[\frac{\hat{\Phi} + w_p - w}{\Phi^* + w_p - w}\right] \tag{14}$$

The above analysis treated electoral frequency as an instrument which could be used to obtain $\overline{G} \approx G^*$ for a given value of w_p. The previous analysis which led to equation (12) described how w_p could be used as an instrument to obtain $\overline{G} \approx G^*$ for a given value of τ. Accordingly, either of these two instruments can be used to obtain $\overline{G} \approx G^*$, even if the other instrument has been set exogeneously. On the other hand, the coordinated use of the two instruments is desirable since the

[40] This analysis ignores the integral constraint, $\tau^* = h/n^*$, where n^* = an integer ≥ 1. This constraint is appropriate if h is fixed (in number of years).

dead-weight income loss associated with $\overline{G} \approx G^*$ will be minimized when both instruments are set optimally. The optimal value of w_p, given that τ is also chosen optimally can be determinted by choosing w_p to minimize the dead-weight income loss which is shown in equation (14). Carrying out the calculations, the resulting values of w_p and τ must satisfy the conditions (which are consistent with equation (12), and therefore also with equation (13)),

$$w_p^* = w - \Phi^* + \sqrt{r\gamma\,(\hat{\Phi} - \Phi^*)} \tag{15}$$

and

$$e^{r\tau^*} = 1 + \sqrt{\frac{r\gamma}{(\hat{\Phi} - \Phi^*)}}\,. \tag{16}$$

The difference between w_p^* and w increases (algebraically) with $\hat{\Phi}$ and γ, and falls with Φ^*. The optimal value of τ is a positive function of γ, and an inverse function of $\hat{\Phi} - \Phi^*$. Numerical values of w_p^* and τ^* depend to the value of $\gamma, \hat{\Phi}$ and Φ^*. As an order of magnitude extimate, Suppose that γ is about \$5 per person in the active electorate. The total of state and local government spending in the U. S. is about \$500 per person. Suppose that $\hat{\Phi}$ is 1 - 2 per cent of this figure and that Φ^* is about one-half of $\hat{\Phi}$. Assuming that one of four persons is an active voter in an election, it follows that $\hat{\Phi}$ is about \$20 - 40 per person in the electorate and Φ^* is about \$10 - 20 per person in the electorate. The implied range for τ^*, as given in equation (16), is 2-3 years. With these numbers, w_p^* (which should be interpreted here as the total payment to public officials) is likely to be negative—depending on w and on the ratio of public officials to total population.

The amount of office-seeking and electoral administration costs implied by the optimal choice of τ and w_p can be determined from equation (14) as

$$v(\tau^*, w_p^*) = \sqrt{r\gamma\,(\hat{\Phi} - \Phi^*)} \tag{17}$$

and

$$\frac{r\gamma}{1 - e^{-r\tau^*}} = \sqrt{r\gamma\,(\hat{\Phi} - \Phi^*)} + r\gamma \tag{18}$$

The second term on the right side of equation (18) represents the electoral administration costs which must be paid under any circumstances. The first term represents the amount of "variable" election costs at the optimal values of w_p and τ. An interesting property of the optimal solution is that this variable cost component is equated to the office-seeking cost, which is indicated in equation

(17).[41] Accordingly, when the optimal values of w_p and τ are chosen, the total electoral administration cost exceeds the office-seeking cost by the amount of the "fixed" administrative cost—that is, by the second term on the right side of equation (18). The amount of office-seeking cost, as shown in equation (17), is itself a positive function of $\hat{\Phi} - \Phi^*$ and γ.

Lame-Duck Effect

The above analysis of political salary and electoral frequency pertains to terms of office prior to the final term. In this model the final term of office is characterized by a higher level of public sector activity, $\hat{G}$, by a higher associated level of non-recouped factor overpayment, $\hat{\Psi} - \hat{\Phi}$, and by a higher level of surplus income, $\hat{v} = \hat{\Phi} + w_p - w$. Over time, the electorate would be interested in minimizing the frequency of lame-duck terms and this frequency depends directly on the ratio τ/h. Hence, there is an additional incentive here for reducing the term of office. Further, the electorate would now be interested in making the full political horizon, h, as long as possible. Hence, any restrictions on length of tenure in office or on direct succession—which have the effect of reducing h—would be undesirable. However, as suggested above, the lame-duck effect on the choice of G hinges on the absence of a device for controlling the actions of officeholders during their final term. The potential importance of the lame-duck effect —in particular, the importance of departures of $\hat{G}$ from G^*—suggests a strong incentive for the formation of an institution to provide the requisite form of control.[42] As suggested before, one aspect of political parties may be the provision of this sort of institutional control function.

VI. Extensions to the Model

Some possible theoretical extensions to the model developed in this paper are the following.

The sources of political income can be enlarged to include a variety of consumer and producer interest group activities. The relation of political income potential to the characteristics of benefited and injured interest groups would be a central part of this analysis. This extension of the model would permit an analysis of governmental activity—in terms of production, taxation and transfers, and legislation—in various areas.

[41] A similar formal result characterizes the choice of optimal transaction frequency in monetary models with lumpy transaction costs. See Barro (1972, section III).

[42] While the control would affect the choice of G and the associated value of $\Psi - \Phi$, it would not seem to affect the surplus income, $\hat{v}$. See n. 20, above.

The model could be usefully extended to incorporate political parties. Some features of parties—interpreted as firms which specialize in the business of politics—which seem relevant are the following. First, as discussed above, parties can serve as a control on lame-duck officeholders. Second, parties would themselves have a longer horizon (h) than individuals (independents), which provides a brand-name effect, in an intertemporal sense, from the viewpoint of the electorate. An additional brand-name effect, which can operate at a single point of time, would involve party endorsements for different public offices. Finally, parties, as specialists in political contacts and procedures, would tend to be more efficient in the collection of political income and in the distribution of political favors. This aspect of parties need not be a negative feature from the electorate's viewpoint, since the collection of a given amount of political income at a smaller dead-weight loss would be generally desirable. Given these features of parties, the model will have to deal with the electorate's choice between party-endorsed and independent candidates, as well as with the nature of the party's control over its endorsees.

The model provides a framework for the analysis of office-seeking activity. This analysis will require the specification of the information and taste-influencing characteristics of these activities. The relation between the level of these activities and the surplus income from public office, as determined in section IV, above, will depend on the conditions of entry into the political industry—for example, on the legal treatment of minority parties—and on other features which influence competition for office, such as any preferential treatment of incumbents.

The model developed in this paper can also be used to analyze alternative institutional arrangements of political control. For example, the framework of indirect government which was considered above could be modified to permit constitutional restrictions on the types or amounts of governmental activity or to include the requirement that certain proposals be submitted for approval by public referendum. Two important elements to consider in evaluating modifications to the framework of indirect government would be the variability over time of the underlying target levels of governmental activity together with the decisionmaking costs associated with different institutional arrangements.

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