A Political Economy Model of Congressional Careers

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Our main goal is to quantify the returns to a career in the United States Congress. We specify a dynamic model of career decisions of a member of Congress and estimate this model using a newly collected dataset. Given estimates of the structural model, we assess reelection probabilities, estimate the effect of congressional experience on private and public sector wages, and quantify the value of a congressional seat. Moreover, we assess how an increase in the congressional wage or the imposition of term limits would affect the career decisions of politicians and the returns from a career in Congress. (*JEL* D72, J44, J45)

Understanding the goals of elected officeholders is of fundamental importance in political economy. Since the appearance of Anthony Downs's (1957) seminal contribution, many theories of representative democracy have assumed that politicians care only about winning elections.[1] While useful in modeling many political decision processes, assuming that politicians are *solely* interested in the goal of reelection makes them seem like odd economic agents. In fact, reelection may be better understood as an (intermediate) objective to realize other goals, like monetary income, the perks of a powerful public office, or the desire to implement certain policies.[2] This suggests an exploration of politicians' motivations in the context of their political careers, and raises the fundamental question: What are the returns to an individual from a career in politics?

A shift from a reelection focus to the study of political careers may have important policy-relevant implications. Consider, for example, the case of term limits. Empirical work on U.S. congressional elections has generated concerns that very high incumbent reelection rates, and the prevalence of large victory margins, may have eroded public accountability of elected officials.[3] These concerns have led several interest groups to advocate the imposition of term limits as a possible remedy.[4] This focus on electoral success, however, may underestimate the electoral risk of incumbents, since particularly vulnerable incumbents may exit in anticipation of electoral defeat. Furthermore, by altering the incentives faced by politicians, term limits are likely to affect their career decisions and may therefore have important consequences for the composition of Congress.

Our analysis starts from the premise that politicians, like other economic agents, are rational

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[1] E.g., Downs's own theory of electoral competition, and David R. Mayhew's (1974a) theory of internal organization of Congress.

[2] For models where politicians are *only* policy motivated see, e.g., Donald Wittman (1977) and Alberto Alesina (1988). See also the related work on citizen candidates by Martin J. Osborne and Al Slivinski (1996) and Timothy Besley and Stephen Coate (1997).

[3] See, e.g., Mayhew (1974b), Gary Jacobson (1987), and Monica Bauer and John R. Hibbing (1989).

[4] See. e.g., Gerald Benjamin and Michael Malbin (1992).

individuals who make career decisions by comparing the expected returns of alternative choices. The main goal of the article is to quantify the returns to a career in the United States Congress. To achieve this goal, we specify a dynamic model of career decisions of a member of Congress, and estimate this model using a newly collected dataset that contains detailed information on all members of Congress in the post-war period. A novel feature of the data is that they incorporate information about post-congressional employment and salaries when members exit Congress. This crucial piece of information allows us to estimate the returns to congressional experience in post-congressional employment, which may be an important part of the returns to congressional careers.

Our framework enables us to sort out the relative importance of two key factors that may induce people to pursue a political career: the utility politicians derive from being in office and the monetary returns to a career in Congress. Using data on important legislative achievements by members of Congress, we relate part of the nonpecuniary rewards from serving in Congress to the desire for political accomplishments. Using our model, we also assess the selection bias in estimates of election probabilities based only on politicians who choose to run, investigate the extent to which politicians' career choices respond to wage incentives, and evaluate the effects of term limits on the value of a congressional seat and on the career decisions of politicians.

The study of congressional careers has a long tradition in American politics (see, e.g., Joseph Schlesinger, 1966; John R. Hibbing, 1991). Recently, several authors have studied the determinants of representatives' choices among three basic career options: (a) run for reelection; (b) run for higher office (e.g., run for Senate in the case of House members); and (c) retire (see, e.g., D. Roderick Kiewiet and Langche Zeng, 1993; Timothy Groseclose and Keith Krehbiel, 1994; Richard L. Hall and Robert P. van Houweling, 1995; Groseclose and Jeff Milyo, 1999). Existing studies suffer, however, from four main limitations that we seek to address.

First, prior studies have estimated static choice models that do not take into account the dynamic aspects of politicians' career choices. For example, the decision of a member of Congress to seek reelection is likely to depend not only on current payoffs, which depend, in turn, on the probability of winning today, but also on the option value of holding the seat, which may depend on the probability of winning a bid for higher office in the future. A second, closely related, problem is that existing studies ignore the career prospects of politicians after they leave Congress (either voluntarily or via losing an election). In deciding whether to run for reelection, a politician may consider how post-congressional wages are influenced by congressional experience. If congressional experience is valuable in the private sector, it may be optimal for politicians to opt out of Congress at a particular point in their careers to maximize post-congressional payoffs.

A third limitation of existing studies is that they typically ignore the selection bias created by politicians' decisions about whether to run for reelection.[5] If we ignore the fact that members of Congress may decide whether to run for reelection or higher office based, at least in part, on their probability of success, this may result in biased estimates of the probabilities of winning elections (see, e.g., James J. Heckman, 1979). A fourth, and related, problem is the failure to deal with unobserved heterogeneity. While the importance of taking into account politicians' (unobservable) personal characteristics, such as "valence" or "charisma," has been recognized by the theoretical literature (see, e.g., Groseclose, 2001; Enriqueta Aragones and Thomas R. Palfrey, 2002), the empirical literature has not yet incorporated politicians' unobserved heterogeneity into the analysis of their career choices.

In this article we provide a new, comprehensive framework for the empirical analysis of congressional careers that addresses these four limitations. Specifically, we develop a dynamic optimization model of the career decisions of a member of the U.S. Congress. We extend prior work by explicitly modelling their career opportunities outside Congress. In particular, we assume that when a politician exits from Congress, he/she can choose between two employment options: one in the private sector and

[5] See Groseclose and Krehbiel (1994) for an exception.

one in the public sector. The wage the politician may obtain in each sector depends, among other things, on congressional experience. In addition, we assume that politicians differ with respect to their (unobserved) skills, which, together with other (observed) characteristics, may affect both their probabilities of winning elections and post-congressional payoffs.[6] We also allow for the possibility that politicians differ with respect to their preferences for holding public office, which may affect their utility from achieving important legislative accomplishments during their congressional tenure and hence their payoffs from serving in Congress.

Our main findings can be summarized as follows. First, congressional experience significantly increases post-congressional wages, both in the private and public sectors. However, the marginal effect of congressional experience on post-congressional wages diminishes quite rapidly with additional experience. Second, the nonpecuniary rewards from being in Congress are rather large (especially in the Senate), suggesting that policy motivations and perks of office play important roles in the career decisions of politicians. In particular, monetary returns alone (that is, wages in Congress and post-congressional payoffs), cannot explain the observed behavior of politicians, and the effect of the congressional wage on their behavior is quite small. Moreover, the payoffs from achieving important legislative accomplishments are quite large (both in the House and in the Senate), although such accomplishments are rare.

Third, politicians' unobserved skills (e.g., valence or charisma), play an important role throughout their congressional careers, as "skilled" politicians have a substantially higher probability of winning elections. Being a skilled politician does not, however, seem to generate better job-market opportunities outside Congress. Thus, there is evidence of comparative advantage, since the relatively skilled politicians are not relatively productive in the private sector. Fourth, we find that the selectivity bias induced by politicians' decisions whether to run for reelection is actually rather modest. Reelection probabilities in the House and Senate are indeed very high, even unconditionally. However, there is substantial selection in terms of who runs for higher office, so that the unconditional probability of a House member winning a bid for higher office is much lower than is suggested by the observed frequency of successful bids.

Finally, we find that the imposition of term limits would substantially increase early voluntary exit from Congress and significantly reduce the value of a congressional seat. Moreover, our analysis indicates that the members of Congress most negatively affected by term limits would be those with better political skills, those who value personal political achievements more, and those who are older.

The rest of the article is as follows. In Section I, we present the model. In Section II, we describe the data. In Section III, we present our estimation results. In Section IV, we assess the value of a congressional seat. In Section V, we present the results of two policy experiments on increasing congressional wages and imposing term limits, respectively. We conclude with Section VI.

I. A Structural Model of Congressional Careers

We assume that politicians make decisions about running for reelection, running for higher office, and exiting Congress (either to retirement or another type of work) every two years—the length of a House term. Politicians are forward looking and realize that current decisions affect the distribution of future payoffs. Thus, they must solve a dynamic optimization problem to determine the current decision that maximizes expected present value of lifetime utility (see, e.g., Zvi Eckstein and Kenneth I. Wolpin, 1989; John Rust, 1994).

We assume that the earliest age at which a person can be elected to Congress is 30, and if a politician lives to age 80, then he/she must exit Congress at that point.[7] These assumptions imply that the dynamic optimization problem has (at most) 25 decision periods. Furthermore,

[6] For example, the ability of politicians to empathize with people may affect their ability to win elections.

[7] Despite some well-publicized exceptions, entering Congress prior to age 30 or staying after age 80 are rare events.

it greatly simplifies our analysis to assume that exit from Congress is an absorbing state—that is, the politician cannot return to Congress after leaving, regardless of the age at which he or she exits.[8]

Our model can usefully be decomposed into several parts: (a) post-congressional payoffs; (b) the decisions of members of Congress; and (c) probabilities of winning elections, committee assignments, and legislative achievements. We now describe these in turn.

A. *Post-Congressional Payoffs*

At the end of each two-year period, a politician who is in Congress has the option of exiting. A key feature of our model is that, when a politician exits from Congress (either voluntarily or via electoral defeat), he/she can choose between two post-congressional employment options, or else retire. The employment options are (a) work in a private sector occupation, or (b) work in a public sector occupation (i.e., enter another political job).[9]

The wages the politician may obtain in the two alternative occupations are determined by age, education, and variables characterizing congressional experience. We specify log wage functions similar in functional form to those in the human capital literature (see, e.g., Jacob Mincer, 1958), except for the inclusion of the congressional experience variables. Our wage functions take the form:

$$\begin{aligned}(1)\quad \ln W_{ijt} = {} & \beta_{0j} + \beta_{1j}\mathrm{Skill}_i + \beta_{2j}\mathrm{BA}_i + \beta_{3j}\mathrm{JD}_i \\ & + \beta_{4j}\mathrm{Age}_{it} + \beta_{5j}\mathrm{Age}_{it}^2 + \beta_{6j}\mathrm{TH}_{it} \\ & + \beta_{7j}\mathrm{TH}_{it}^2 + \beta_{8j}\mathrm{TS}_{it} + \beta_{9j}\mathrm{TS}_{it}^2 \\ & + \beta_{10j}\mathrm{COM}_{it} + \beta_{11j}\mathrm{VE}_{it} + \varepsilon_{ijt}\end{aligned}$$

where W_{ijt} is the wage offered to individual i in occupation j in period t, for $j = 1,2$, and $t = 1, \ldots, 25$.

This specification allows for the possibility that individuals have different unobserved endowments of skills for each occupation (as in Michael Keane and Wolpin, 1997). The variable Skill_i indexes the (unobserved) endowment vectors and is simply a dummy variable equal to 1 if the (unobserved) type of politician i is "skilled." The case where the dummy variable $\mathrm{Skill}_i = 0$ corresponds to the default or "normal" type. The error term ε_{ijt} represents the purely stochastic component of the wage offer, which is revealed when the politician exits Congress.[10]

Turning to the observables in the wage functions, BA_i and JD_i are dummy variables denoting whether individual i has a bachelor's degree and a law degree, respectively. TH_{it} and TS_{it} are the number of prior terms served in the House and Senate, respectively. COM_{it} is a dummy variable equal to 1 if, during the prior term in the House, a representative had served on a major House committee.[11] Political scientists typically define the major House committees as Ways and Means, Appropriations, and Rules (see, e.g., Christopher J. Deering and Steven S. Smith, 1990). The idea is that service on one of these major committees may augment the human capital one brings to post-congressional employment. For example, being a member of the Ways and Means Committee might generate knowledge that would enhance one's value as a lobbyist for companies seeking to obtain tax breaks.

Finally, VE_{it} is an indicator for whether the politician exited Congress voluntarily rather than via losing a reelection bid. Our rationale for including this variable in the wage functions is that the mode of exit may affect the value of the politician in certain types of jobs. But the sign of this effect is a priori ambiguous. Losing an election may reduce the politician's value in jobs where popularity is important. But, on the other hand, exiting Congress voluntarily may

[8] Returning to Congress after an exit is also a rare event (it occurs in less than 5 percent of the cases), so we feel this is a reasonable simplification.

[9] By other political jobs, we are thinking primarily of appointed positions, such as cabinet posts, bureaucratic positions, etc. We abstract from the fact that a politician might have to run (or be confirmed) for some non-congressional positions.

[10] We assume that the vector of wage error terms $\varepsilon_{it} = (\varepsilon_{i1t}, \varepsilon_{i2t})$ has a bivariate normal distribution, $\varepsilon_{it} \sim \mathcal{N}(0, AA')$, where A is a lower triangular matrix with coefficients a_{11}, a_{12} and a_{22}.

[11] Committee membership is less important in the modern Senate (see, e.g., Barbara Sinclair, 1989).

signal a desire to "slow down," thus reducing the perceived value of the politician to potential employers.

A third option upon exit is retirement. In this case, the politician may, depending on age and length of service, be eligible to receive pension payments. We describe the congressional pension rule in detail in Diermeier et al. (2004). Here, we write the pension rule as $PE_{it}(Age_{it}, TH_{it}, TS_{it})$ to indicate that the pension payment PE_{it} that individual i will begin to receive if he/she retires at time t depends on his/her age as well as terms in the House and Senate. Then, the payoff in the retirement option is:

$$(2) \qquad PR_{it} = PE_{it}(Age_{it}, TH_{it}, TS_{it}) + \alpha_L + \alpha_{VE} VE_{it}.$$

The parameter α_L captures the monetized value of leisure, while α_{VE} captures an additional value of leisure for those who exit Congress voluntarily rather than via losing an election. Thus, $\alpha_{VE} > 0$ captures the notion that those who exit voluntarily desire to slow down, so their value of leisure after exiting Congress is relatively high.[12] This enables our model to capture the fact that those who exit voluntarily are much more likely to choose retirement than further employment, even conditional on age and other characteristics. To achieve a more compact notation, let XP_{it} denote the set of state variables relevant for the determination of post-congressional payoffs. We have:

$$(3) \qquad XP_{it} = (Skill_i, BA_i, JD_i, Age_{it}, TH_{it}, TS_{it}, COM_{it}, VE_{it}).$$

Equations (1) and (2) give the per-period payoffs for each of the three post-congressional alternatives at exit. We do not model behavior beyond the first choice that a politician makes after exiting Congress.[13] Rather, we assume that exogenous death and retirement transition probabilities govern outcomes from that point onward. Specifically, if the politician chooses employment option j, for $j = 1,2$, then he/she will remain in that alternative until either retirement or death. Once the politician enters retirement he/she stays in that state until death. Let $\pi_r(t)$ and $\pi_d(t)$ be the retirement and death probability, respectively. These are functions of t since they depend on age at exit from Congress. They also vary with age after exit, but it simplifies the exposition to ignore this.[14] Letting δ denote the per-period discount factor, the present discounted value of private sector employment can be written as:

$$(4) \quad PV_1(W_{i1t}) = \frac{W_{i1t} + \alpha_{1C} COM_{it}}{1 - \delta[1 - \pi_d(t)][1 - \pi_r(t)]} + \frac{\delta[1 - \pi_d(t)]\pi_r(t) PV_3(PR_{it})}{1 - \delta[1 - \pi_d(t)][1 - \pi_r(t)]}$$

while, for the public sector, we have:

$$(5) \quad PV_2(W_{i2t}) = \frac{W_{i2t} + \alpha_{2W} + \alpha_{2C} COM_{it}}{1 - \delta[1 - \pi_d(t)][1 - \pi_r(t)]} + \frac{\delta[1 - \pi_d(t)]\pi_r(t) PV_3(PR_{it})}{1 - \delta[1 - \pi_d(t)][1 - \pi_r(t)]}.$$

In equation (5), α_{2W} captures the additional utility of holding another political job. If politicians get nonpecuniary rewards from being in Congress, it seems reasonable to assume they may also get nonpecuniary rewards from other political jobs. The parameters α_{1C} and α_{2C} capture the monetized value of having served on a major House committee, which may generate additional income from speaking engagements, consulting, book contracts, etc. We allow the value from these activities (which we do not

[12] In principle, this desire to "slow down" could stem from a taste shock, a health shock, a shock to family structure, etc.

[13] We do this because, in our data, we observe only the first occupation (and first wage) after a politician exits Congress.

[14] We construct death probabilities, π_d, from the empirical hazard. Information on retirement from post-congressional occupations, however, is (for the most part) unavailable. Thus, we assume that the retirement probability (π_r) before age 62 is equal to zero, and specify that retirement probabilities after age 62 are a logistic function of age. The coefficients of the retirement probability function are estimated jointly with the other parameters of the model.

observe) to differ depending on whether the politician's post-congressional occupation is in the private or public sector. Similarly, the present discounted value of the retirement option is:

$$(6) \quad PV_3(PR_{it}) = PR_{it}/[1 - \delta(1 - \pi_d(t))].$$

Throughout the model, we assume there is an idiosyncratic (politician-specific) taste shock associated with each possible choice a politician can make in any decision period. Thus, regarding post-congressional choices, the values of the three exit options may be written as $V_j = PV_j + \xi_j$ for $j = 1,2,3$, where ξ_j is the taste shock associated with alternative j. Following Rust (1987), we assume all the taste shocks are *i.i.d.* type I extreme value. This assumption allows us to derive simple expressions for the expected maximum value over the whole choice set, $V_E(XP_{it})$, as well as for the probabilities a politician would choose any of the three alternatives.[15]

B. *Decisions of Members of Congress*

We begin by considering the decisions of a sitting senator. Of course, senators can run for other offices, like president or governor. But such decisions are rather infrequent, and to include them explicitly leads to drastic complications. Thus, we subsume these decisions in the exit option.[16]

Even though a Senate term is six years, we assume that senators make decisions every two years, since early exit by senators is not uncommon in the data. The set of options a senator faces depends on whether his/her seat is up for election in a given period. Define a state variable ST ("Senate term") that is equal to 1, 2, or 3 as the senator has served 2, 4, or the full 6 years of his/her term. If ST = 1,2 then the senator has two options: to continue sitting in the Senate or exit Congress. If ST = 3 then the senator has to decide whether to run for reelection or exit Congress.

Denote by XS_{it} the set of state variables relevant to the decisions and/or electoral prospects of senators. We have:

$$(7) \quad XS_{it} = (XP_{it}, SOS_{it}, SOW_t, Party_i, Achieve_i, Scandal_{it}, ST_{it}, Cohort_i).$$

Obviously this includes XP_{it}, the set of state variables that determine the distribution of post-congressional payoffs should the politician exit the Senate, which we defined in (3). The state vector also contains measures of the political climate, which influence the senator's reelection chances, denoted SOS_{it} ("state-of-the-state") and SOW_t ("state-of-the-world"). These state variables indicate, respectively, whether conditions in the senator's home state and aggregate conditions favor election of a Democrat or a Republican, or are neutral.

We describe the construction of SOS and SOW in detail in Diermeier et al. (2004). Here, it suffices to say that in each period, we classify each U.S. state as being relatively good, neutral, or bad for the election of Democrats (SOS) based on the state's vote in presidential elections relative to the national vote.[17] Similarly, in each period, we classify the situation in the United States as a whole (SOW), based on the aggregate outcome of all congressional elections to the House of Representatives. (Note that we construct SOS_{it} as a measure of the state of the state *relative* to the aggregate state of the world.) We assume that the senator knows the state of his/her state as well as the state of the world prior to making the decision on whether to exit, run for reelection, or stay in the Senate.[18]

[15] For every choice we need only estimate the standard deviation of the corresponding taste shock. For details on the choice probabilities and the expected value functions, see Diermeier et al. (2004).

[16] That is, if a senator does become a governor, we treat it just like any other post-congressional political job.

[17] Minnesota, for example, would always be a good state for Democrats, whereas a number of Southern states have shifted from being good for Democrats to good for Republicans during our sample period.

[18] The state variables SOS and SOW are assumed to evolve over time according to two (independent) Markov processes with transition probabilities $P(SOS_{i,t+1} | SOS_{it})$ and $P(SOW_{t+1} | SOW_t)$, respectively. We estimate these probabilities in an unrestricted way from the empirical transition frequencies, and use those values in estimation.

Cleary the variable Party_i, which indicates whether a politician is a Democrat or Republican, is also relevant since, for example, its interaction with SOS_{it} and SOW_t affects a politician's electoral chances. We assume political party is a fixed characteristic of a politician.[19]

We allow politicians to differ with respect to their (unobserved) political skills, summarized by the variable Skill_i, which is contained in XP_{it}. We also allow for the possibility that politicians have different unobserved preferences for holding office, which affect the utility they derive from important legislative accomplishments. The variable Achieve_i indexes the (unobserved) preference-type of a politician and is simply a dummy variable equal to 1 if the politician is an "achiever" (i.e., he/she values personal legislative achievements). As with the variable Skill_i, the case where $\text{Achieve}_i = 0$ corresponds to the default or "normal" type. Hence, since there are two possible skill-types and two possible preference-types, our analysis admits four different unobserved types of politicians.

In our empirical work, we define "important legislative accomplishments" to include such things as sponsoring a major piece of legislation or casting the decisive vote on an important policy issue.[20] Our assumption that there exists an "achiever" type is motivated by the empirical observation that important legislative accomplishments are attained only by a relatively small subset of members of Congress, and that these politicians, in turn, often have multiple achievements.

The state variable Scandal_{it} in (7) is an indicator for being involved in a scandal at time t. Obviously, this is relevant to a senator's electoral chances. Finally, Cohort_i is a variable indicating whether a politician entered Congress in 1947–1965, 1967–1975, or 1977–1993. We use this variable to capture changes in congressional wages over time.[21]

Now consider the decision of a senator when $\text{ST} = 1$. In this case, the senator's seat is not up for election, so the choice is simply to stay in office or exit. If the senator decides to stay in office, then he/she receives the per-period payoff from sitting in the Senate, which includes the possibility of an important legislative accomplishment in the current session of Congress. Denote by $V_S(\text{XS}_{it}, s)$ the value of choosing the Senate option given the relevant state variables (XS_{it}, s), where the second element of the state vector indicates that the politician is already a sitting senator. We have:

$$(8)\quad V_S(\text{XS}_{it}, s) = W_S(t) + \alpha_S + \text{Achieve}_i p_{\text{AS}}(\text{XS}_{it})\alpha_{\text{AS}} + \mu_{1\text{Sit}} + \delta(1-\pi_{\text{d}}(\text{t}))\text{EV}(\text{XS}_{t,t+1}, s).$$

The first four terms in (8) capture the immediate payoff from staying in the Senate at time t. $W_S(t)$ is the wage the senator receives, and α_S captures the monetized value of the per-period nonpecuniary rewards from being in the Senate. While all senators receive these rewards, those of the type who value personal legislative achievements (i.e., $\text{Achieve}_i = 1$) may also receive additional utility contingent on an important legislative accomplishment. We let $p_{\text{AS}}(\text{XS}_{it})$ denote the probability of a political achievement by a senator, while α_{AS} is the monetized value of the utility the achievement generates.[22] The term μ_{1Sit} is a stochastic component to i's utility from being in the Senate at

[19] There are instances of politicians changing parties while in Congress over the sample period, but to include the possibility of changing party would substantially complicate our model, and such instances are sufficiently rare (they occur in less than half of 1 percent of the cases), that we feel it is a reasonable approximation to ignore them.

[20] Our measure of important legislative accomplishments is based on Mayhew (2000). (See Diermeier et al., 2004, for details).

[21] Wage paths were very similar for members within each entering cohort defined here, regardless of entry year. Thus, we constructed cohort-specific wage paths using time-specific averages across the cohort members. If we let each entering class be its own cohort (i.e., have its own wage path), it drastically expands the state space and increases computational time. This cost did not appear justified given the limited variation of wage paths within cohorts.

[22] The assumption that only "achievers" derive utility from accomplishments guarantees that α_S and α_{AS} are separately identified. Otherwise, identification would hinge subtly on variation of p_{AS}, the probability of achievement, with XS_{it}.

time t, which may capture random fluctuations in the nonpecuniary rewards over time.[23]

The last term in (8) captures the future component of the value from staying in the Senate. This is equal to the discount factor, δ, times the probability of survival to the next decision period, $(1-\pi_d(t))$, times the expected value of the state the politician will arrive at in period $t+1$ given survival, $\mathrm{EV}(\mathrm{XS}_{i,t+1}, s)$. This is the expected maximum of the value of staying in the Senate, $V_S(\mathrm{XS}_{i,t+1}, s)$, and the value of exit, $V_E(\mathrm{XP}_{i,t+1})$, in period $t+1$. The expectation is taken over the time-$t+1$ realizations of the variables SOS, SOW, and μ_{1Sit+1}, which affect the value of these options at $t+1$.

Consider now the senator's decision when $\mathrm{ST}=3$.[24] At that point the senator's seat is up for election, and he/she can run for reelection or leave Congress. If the senator runs, the probability of winning is $p_S(\mathrm{XS}_{it})$.[25] Hence, the value of running for reelection to the Senate is given by:

$$(9)\quad V_{\mathrm{RS}}(\mathrm{XS}_{it}, s) = p_S(\mathrm{XS}_{it})\mathrm{EV}_S(\mathrm{XS}_{it}, s) + (1 - p_S(\mathrm{XS}_{it}))V_E(\mathrm{XP}^*_{it}) + (\alpha_{RS} + \mu_{RSit})$$

which is equal to the probability of winning times the expected value of sitting in the Senate for the next period, plus the probability of losing times the value of exit (recall that a senator who loses a reelection bid then makes a post-congressional career decision),[26] plus the term $\alpha_{\mathrm{RS}} + \mu_{\mathrm{RS}it}$. Here, α_{RS} is the utility a senator gets from running for the Senate (which may be positive or negative, and whose sign is not obvious a priori), and $\mu_{\mathrm{RS}it}$ is the idiosyncratic component of the utility of running for reelection, which is specific to senator i at time t. Finally, XP^*_{it} denotes the XP_{it} sub-vector of XS_{it} with VE_{it} set to 0, since the senator exits via losing rather than voluntarily.

Decisions of representatives are more complex than those of senators, because representatives may have the option of running for the Senate. The choice set includes this option only if a Senate seat is up for election in the representative's state. Moreover, if a Senate seat is up for election, a representative's chances of winning the seat depend critically on the seat's incumbency status. If there is an incumbent senator of the representative's own party running for the seat, then (presumably) there is little chance he/she can win it. If there is an incumbent running from the other party then the chances of winning may be better, but they are still likely to be small. If the seat is open, however, the representative's chances of winning may improve substantially.

Letting XH_{it} be the set of state variables relevant to the decisions and/or electoral prospects of representatives, we have:

$$(10)\quad \mathrm{XH}_{it} = (\mathrm{XP}_{it}, \mathrm{SOD}_i, \mathrm{SOS}_{it}, \mathrm{SOW}_t, \mathrm{Party}_i, \mathrm{Achieve}_i, \mathrm{Scandal}_{it}, \mathrm{Redist}_{it}, \mathrm{ES}_{it}, \mathrm{Cycle}_{it}, \mathrm{INC}_{it}, \mathrm{Cohort}_i)$$

where XP_{it} denotes the vector of state variables relevant to post-congressional payoffs; the variables SOS_{it}, SOW_t, Party_i, $\mathrm{Achieve}_i$, $\mathrm{Scandal}_{it}$, and Cohort_i were already introduced when we described the decisions of senators. Turning to the newly introduced state variables, note that a key aspect of a representative's decision problem is to forecast when Senate seats in his/her state will be up for election and, if they are, whether an incumbent will be running, and what the incumbent's party affiliation is. The problem is complicated by the fact that each state has two senators and it is uncertain when (and

[23] We assume that μ_{1Sit} is equal to the *difference* of two *i.i.d.* type I extreme value error terms. This generates a logit form for the probabilities that the politician stays or exits (since the value of the exit option, $V_E(\mathrm{XP}_{i,t+1})$, has no error). Note also that μ_{1Sit} is a state variable relevant to the time t decision, but, since it is serially independent, we follow convention and do enter it explicitly in our value function expressions.

[24] There are no important differences in the decisions of senators when $\mathrm{ST}=1$ or $\mathrm{ST}=2$.

[25] We assume the senator decides whether to run before the random variable $\mathrm{Scandal}_{it}$ is realized. Thus, the decision to run is based on a probability of winning that is the weighted average of the probabilities with and without a scandal. We fix the probability of a scandal in the Senate at 0.0049, which is equal to the frequency in the data.

[26] Note that we do not model the outcome of primaries and general elections separately. If a senator or a representative loses a bid for reelection we do not distinguish if this was due to losing a primary or a general election.

if) Senate seats will become open, because senators may die in office, leave the Senate before the end of their terms, or decide not to run when their terms end.[27]

To capture these aspects of the problem, we define new state variables that we call Cycle, INC, and ES. The position of a state in its "Senate cycle" refers to the number of periods until each of its two Senate seats comes up for election, barring unusual circumstances like death or early retirement of sitting senators. Cycle = 1,2,3 indexes the three possible positions in the cycle, which are $(a,b) = (0,1), (0,2)$ or $(1,2)$, respectively, where a is the number of periods until a Senate seat is first scheduled to come up, and b is the number of periods until the next Senate seat is scheduled to come up. Thus, e.g., when Cycle = 1 there is a Senate election scheduled for both t and $t + 1$. The variable Cycle evolves deterministically (i.e., scheduled elections are unaffected by deaths or retirements of senators).

The state variable INC = 1, ... ,4 indexes the four possible states of incumbency for a state's two Senate seats, with the seats ordered by which one is scheduled to come up for election first (as in the definition of Cycle). Letting D and R denote Democrat and Republican, respectively, the possibilities are (D,D), (D,R), (R,D), (R,R). Thus, if INC = 3 we have (R,D) which means the first seat has an incumbent Republican, while the next has an incumbent Democrat.

The state variable ES ("election status") determines the set of options a representative faces. If ES = 1 there is no Senate seat up for election in the representative's state, so his/her only options are to run for reelection or leave Congress. If ES = 2, 3, or 4, there is a Senate seat up for election in the representative's state. There is an incumbent Democrat or Republican senator running for reelection as ES = 2 or ES = 3, respectively. If ES = 4 the seat is open. ES and INC evolve stochastically because of death and retirement by senators, and uncertainty about whether incumbent senators will run for reelection.[28]

Another state variable relevant to electoral prospects is SOD_i ("state-of-the-district"), which indicates whether conditions in the representative's district *typically* favor election of a Democrat or a Republican, or are neutral, relative to the political climate in the representative's state. We describe the construction of SOD in detail in Diermeier et al. (2004). Here, it suffices to say that we classify each district as being relatively good, neutral, or bad for the election of Democrats based on the district's vote in presidential elections relative to the state vote, averaged over the period of the representative's tenure. Thus, for each representative, we define SOD as an *average* characteristic of his/her district and assume that SOS and SOW capture all time-varying aspects of the electoral climate.[29] For instance, a Democrat in a strongly Democratic district will normally have a high probability of reelection, but this probability is lower in years when the state and national political climate are favorable for Republicans.[30]

Two other state variables that affect a representative's electoral prospects are whether his/her district has been affected by redistricting (in

[27] Clearly, a senator's decision to exit may depend on the identities of representatives who may run for his/her seat, as well as on decisions of other senators. Similarly, a representative's decision to run for Senate may depend on which other representatives from the same state are likely to do the same. Hence, the decisions of politicians may be viewed as outcomes of a dynamic game among the members of Congress. While certainly interesting, such an extension is clearly beyond the scope of our analysis. In this article we abstract from all strategic considerations.

[28] We specify that the vector (INC, ES) evolves according to a Markov process with transition probabilities $P(\mathrm{INC}_{i,t+1}, \mathrm{ES}_{i,t+1} | \mathrm{Cycle}_{it}, \mathrm{INC}_{it}, \mathrm{ES}_{it})$. Note that INC and ES could be predicted perfectly using lagged Cycle, INC, and *ES* if incumbent senators always ran for reelection and never left office due to death, appointment to other offices, or early retirement. Thus, these are the natural variables to use in predicting INC and ES. Of the 768 elements in this transition matrix, only 240 are feasible and, within this subset, only 56 are positive. We estimate these elements using empirical frequencies from the data, and then treat them as known in the solution and estimation of the model.

[29] Thus, in our model, a phenomenon like the shift of the South from being solidly Democratic to being more Republican in recent years is captured by changes over time in SOS, since SOD is measured relative to SOS. Also note that, while we assume that *SOD* remains constant over a representative's time in office, it is allowed to change when the identity of the district's representative changes.

[30] SOS_{it} and SOW_t also influence the chances of winning a bid for higher office if a Senate seat is up for election. And, even with no Senate election at time t, SOS_{it} and SOW_t help forecast the chance of winning a Senate bid in the future.

which case the dummy variable Redist_{it} takes the value 1 and zero otherwise) and whether the politician is currently involved in a scandal (Scandal_{it}).

The last variable in (10) is Cohort_i, which, as we noted when discussing senators, captures changes in congressional wages over time. Additionally, Cohort is important for representatives because, as is well known, House reelection probabilities have changed over time. A preliminary analysis of our data suggested clear breaks between the three entering cohorts we define.

The timing of events in the decision process for a representative is as follows. At the end of a two-year term, the representative decides whether to exit, run for reelection, or, if the option is available, run for Senate. At the time this decision is made, the politician knows the state of his/her district (SOD), as well as SOS and SOW for the upcoming election. The representative also knows whether a Senate seat is up for election, whether an incumbent will run for the seat, and, if so, the party of that incumbent. All these variables, along with the stochastic realizations of Redist and Scandal, affect his/her electoral prospects. If the politician decides to run for the House or Senate, he/she then gets a draw from a probability distribution that determines the election outcome. If the politician wins reelection to the House, he/she then gets draws from probability distributions that determine (a) if he/she is made a member of a major committee, and (b) if he/she has an important legislative accomplishment in that term. Then the process repeats itself. On the other hand, if the politician loses, or decides to leave Congress, he/she chooses an exit option, and the process terminates.

Consider a representative's decision when ES = 2, 3, or 4, so running for the Senate, running for reelection, or exiting Congress are all available options. The value of running for Senate is then:

$$(11)\quad V_{\text{RS}}(\text{XH}_{it}, h) = p_{\text{HS}}(\text{XH}_{it})\text{EV}_S(\text{XS}_S, s) + (1 - p_{\text{HS}}(\text{XH}_{it}))V_E(\text{XP}^*_{it}) + (\alpha_{\text{HS}} + \mu_{\text{HS}it})$$

where h indicates that the politician is sitting in the House. Equation (11) resembles (9), the value to a sitting senator of running for Senate, except that (a) the probability of winning, $p_{\text{HS}}(\text{XH}_{it})$, is different (in particular, it also depends on whether an incumbent senator is running for the seat), and (b) we allow the (mean) direct utility or disutility to a representative of running for a Senate seat, α_{HS}, to differ from the utility or disutility that a sitting senator would receive.

On the other hand, the value of running for reelection to the House is:

$$(12)\quad V_{\text{RH}}(\text{XH}_{it}, h) = p_H(\text{XH}_{it})\text{EV}_H(\text{XH}_{it}, h) + (1 - p_H(\text{XH}_{it}))V_E(\text{XP}^*_{it}) + (\alpha_{\text{RH}} + \mu_{\text{RH}it})$$

where $p_H(\text{XH}_{it})$ is the probability of winning reelection to the House.[31] The term α_{RH} is the value of the direct utility that a representative gets from running for the House (which may be positive or negative, and whose sign is not obvious a priori), while $\mu_{\text{RH}it}$ is the idiosyncratic component of the utility of running for reelection, which is specific to House member i at time t.

The expected value of sitting in the House given reelection at time t is:

$$(13)\quad \text{EV}_H(\text{XH}_{it}, h) = W_H(t) + \alpha_H + p_C(\text{XH}^*_{it})\alpha_C + \text{Achieve}_i p_{\text{AH}}(\text{XH}_{it})\alpha_{\text{AH}} + \delta(1 - \pi_d(t))\text{EV}(\text{XH}_{i,t+1}, h|\text{XH}_{it}).$$

The first four terms in (13) capture the current component of the payoff from sitting in the House at time t. $W_H(t)$ is the wage, and α_H is the monetized value of the utility of sitting in the House. The parameter α_C is the monetized

[31] We assume a representative decides whether to run before the random variables Redist_{it} and Scandal_{it} are realized. Thus, the probability of winning in (12) is an unconditional probability integrated over the realizations of Redist_{it} and Scandal_{it}. The probability of redistricting is set at 0.2628, and the probability of a scandal in the House is set at 0.0080, which are equal to the frequencies in the data.

value of the utility of being named to a major House committee, which is multiplied by the probability of being named, $p_C(\mathrm{XH}^*_{it})$, to get the expected utility.[32]

In addition, a representative of the type that values personal legislative achievements (i.e., $\mathrm{Achieve}_i = 1$) may also receive additional utility that is contingent on having an important legislative accomplishment in that period. We denote the probability of a political achievement by a representative by $p_{\mathrm{AH}}(\mathrm{XH}_{it})$, while α_{AH} is the monetized value of the utility increment generated by an achievement. Expected utility from legislative achievement is the product of these terms.[33]

The last term in (13) is the future component, which consists of the discount factor times the probability of survival to the next decision period, times the expected value of the state the representative will occupy at time $t + 1$ when he/she next makes decisions about exiting Congress or running for office. This expectation is taken over several pieces of information, revealed after the representative is reelected at t, which affect the value of his/her options at time $t + 1$. These are the realizations of: (a) selection to a major committee; (b) variables that affect election prospects in the next election (SOS, SOW, Redist, and Scandal); (c) the status of the two Senate seats in his/her state at the time of the $t + 1$ election; and (d) the set of taste shocks at time $t + 1$.[34]

C. *Probabilities of Winning, Committee Assignments, and Legislative Achievements*

In Section I B, we introduced six functions that determine the probabilities of winning elections, important legislative achievements, and being named to a major House committee. We specify that each probability function, $p_S(\mathrm{XS}_{it})$, $p_H(\mathrm{XH}_{it})$, $p_{HS}(\mathrm{XH}_{it})$, $p_C(\mathrm{XH}^*_{it})$, $p_{\mathrm{AS}}(\mathrm{XS}_{it})$, and $p_{\mathrm{AH}}(\mathrm{XH}_{it})$, has a logistic form. The state variables that enter each of these logit probability functions are described in Table 1. The first column of the table lists all state variables in our model. In the subsequent columns, a check mark indicates a state variable is included in a particular probability function, a dash indicates it is not pertinent, and a blank space indicates it is intentionally excluded.

For example, in the third column, we describe the probability of winning reelection to the House, $p_H(\mathrm{XH}_{it})$. This function includes the politician's age, terms in the House, major committee membership, whether the person is a skilled politician, Cohort, Party, Redist, and Scandal, and the set of variables that describe the political climate for the election (SOD, SOS, and SOW). But of course it does not include TS and ST, which are only relevant for senators, VE, which only matters after exit from Congress, or ES, Cycle, and INC, which affect only opportunities to run for Senate. The potentially relevant variables that we chose to exclude are BA, JD, and Achieve. The first two were excluded because preliminary analysis suggested they were unimportant.[35] We exclude Achieve on theoretical grounds, since Skill captures unobservables related to ability to win elections. Recall that in our model there are four types, given by all possible combinations of Skill and Achieve. If "achievers" also tend to be "skilled," it will be captured by the "skilled achiever" type being relatively prevalent.

The probability functions of achieving important legislative accomplishments, $p_{\mathrm{AS}}(\mathrm{XS}_{it})$ and $p_{\mathrm{AH}}(\mathrm{XH}_{it})$, are quite parsimonious, depending only on terms in Congress, party affiliation and, for representatives, membership in major committees. Note that these functions are relevant only for "achievers,"

[32] Recall that in (3) we defined XP_{it} as including the House committee status state variable COM_{it}, which is therefore included in XH_{it}. Hence, we let XH^*_{it} denote the vector of state variables XH_{it}, but with COM_{it} replaced by COM_{it-1}.

[33] The assumption that only "achievers" derive utility from accomplishments guarantees that α_H and α_{AH} are separately identified. Otherwise, identification would hinge subtly on variation of p_{AH}, the probability of achievement, with XH_{it}.

[34] It is straightforward to work out the relevant value functions for a sitting representative's decision when ES = 1, where the option of running for Senate is not available. They are therefore omitted.

[35] Prior to estimation of the full model, we estimated reduced-form logits that contained all the pertinent state variables for each probability function, and conducted specification tests to determine which state variables could be dropped.

TABLE 1—SPECIFICATION OF PROBABILITY FUNCTIONS

State variable	$p_S(XS_{it})$	$p_H(XH_{it})$	$p_{HS}(XH_{it})$	$p_C(XH^*_{it})$	$p_{AS}(XS_{it})$	$p_{AH}(XH_{it})$
BA_t						
JD_t						
Age_{it}	√	√	√	√		
TH_{it}		√	√	√		√
TS_{it}	√	—	—	—	√	—
$COM_{it}(COM_{it-1})$*	—	√		√*	—	√
VE_{it}	—	—	—	—	—	—
$Party_t$	√	√	√	√	√	√
$Skill_i$	√	√	√	√		
$Achieve_t$					√	√
SOD_i	—	√		√	—	
SOS_{it}	√	√	√	√		
SOW_t	√	√	√	√		
$Scandal_{it}$	√	√	√			
$Redist_{it}$	—	√			—	
ST_{it}	√	—	—	—		—
ES_{it}	—	—	√	—	—	—
$Cycle_{it}$	—	—	√	—	—	—
INC_{it}	—	—	√	—	—	—
$Cohort_i$		√				

Notes: $p_S(XS_{it})$ is the probability of winning reelection to the Senate; $p_H(XH_{it})$ is the probability of winning reelection to the House; $p_{HS}(XH_{it})$ is the probability of winning a Senate election for a House representative; $p_C(XH^*_{it})$ is the probability of being named to a major House committee; $p_{AS}(XS_{it})$ and $p_{AH}(XH_{it})$ are the probabilities of an important legislative accomplishment by a senator and a representative, respectively. A check mark indicates a state variable is included in a particular probability function, a dash indicates it is not pertinent, and a blank space indicates it is intentionally excluded. The asterisk indicates that COM_{it-1} replaces COM_{it} in the vector of state variables.

since only they have a positive probability of achievement.[36]

D. *Identification*

As we noted in the introduction, most existing studies that estimate election probability functions ignore the selection bias that arises because we observe election outcomes only for the selected sample of politicians who choose to run. Our model implements a selection correction to deal with this problem. That is, one can think of our model as generating a reduced form decision rule that politicians use to decide whether or not to run. This decision rule is analogous to the choice (or "observation") equation in simple static selection models, such as in Heckman (1979). As is well known (see, e.g., the discussion in Heckman and Bo E. Honore, 1990), identification of selection models hinges crucially on exclusion restrictions or "instruments," by which we mean variables that enter the choice equation (i.e., the decision rule for running), but not the outcome equation (i.e., the probability of winning function).[37] Our model generates a natural set of exclusion restrictions.

For instance, Table 1 shows all the variables that enter $p_H(XH_{it})$, the probability of reelection to the House. The excluded state variables, which affect decisions to run for reelection to the House, but that do not enter $p_H(XH_{it})$, in-

[36] Since only "achievers" derive utility from legislative accomplishments, it is reasonable to assume that they are the only politicians who will seek them.

[37] Intuitively, the extent of selection bias is a decreasing function of the probability of running. Exclusion restrictions enable one to alter a variable, say X, that enters the probability of winning function, while simultaneously altering an excluded variable, say Z, so as to hold the probability of running fixed. This identifies the effect of X on the probability of winning, since, by holding the probability of running fixed, one holds the effect of selection fixed. Without exclusions, a selection model is identified purely from functional form and/or distributional assumptions.

clude variables that (a) influence the values of post-congressional career options; and (b) influence the opportunity to run for higher office. The former set of variables includes BA and JD, which have an impact on wages outside of Congress. It also includes the congressional pension.[38] The latter set of variables includes ES, Cycle, and INC, which determine whether a Senate seat is up for election in the representative's state, as well as the incumbency status of the seat. These variables affect current and future chances of winning bids for higher office, but do not affect the probability of winning reelection in the House.[39]

Another issue concerns identification of how post-congressional wages depend on congressional experience. Of course, we also have exclusion restrictions here, because there are many variables in our model that affect decisions to exit Congress but that do not affect wages. Most obviously, these include SOD, SOS, and SOW, which influence reelection prospects. It is important to note, however, that we can identify only how *incremental* terms in Congress affect post-congressional wages. Since our dataset includes only members of Congress, we cannot identify the effect of a politician's first term in Congress on post-congressional wages (i.e., the effect of the first term is subsumed in the intercept of our wage functions). To identify the effect of the first term would be difficult, because one would need additional instruments that affect the probability of running for Congress in the first place, but that do not affect post-congressional wages.

Next, consider how the fraction of "achievers," π_A, and the probabilities of achievement, p_{AH} and p_{AS}, are identified. For simplicity, consider only the House, and assume π_A and p_{AH} are constants that do not depend on state variables or covariates. Now, suppose that a fraction μ of representatives has an achievement each term. Further suppose that this same subset of representatives has achievements every term. It would then be clear that $p_{\mathrm{AH}} = 1$ and $\pi_A = \mu$. On the other hand, if there were no persistence of achievement within an individual history, we would estimate $p_{\mathrm{AH}} = \mu$ and $\pi_A = 1$. It is the extent of persistence of achievement within individual histories that determines how the estimates of p_{AH} and π_A fall between these two extremes.[40]

Finally, consider identification of the utility function parameters. Our model implies a structural decision rule for whether to run for reelection or higher office. This decision rule is a function of a set of nonpecuniary rewards, along with congressional wages, election probabilities, and post-congressional earning opportunities. The political climate variables affect these decisions only via their effect on election probabilities, and the BA and JD variables matter only because they affect outside earning opportunities. Thus, these two sets of variables provide instruments that identify the effect of election probabilities and outside opportunities on decisions to run for reelection or higher office.

Given that we can identify the monetary returns to congressional experience, probabilities of winning, and probabilities of achievements and committee assignments as described earlier, and given that we can identify how reelection probabilities and outside earning opportunities affect decisions to run for reelection and higher office (as just described), the 13 utility function

[38] In (2) we wrote the pension as a function of Age and TH, which also enter the probability of winning reelection in the House. The pension rule, however, has discontinuities at particular age and experience levels (see Diermeier et al., 2004). These discontinuities affect decisions to run (while not affecting reelection probability), giving another source of identification.

[39] Similarly, variables that influence the decision of a representative to run for the Senate, but that do not enter the Senate election probability function, include: (a) variables that influence the values of post-congressional career options; and (b) variables that influence the value of running for reelection to the House. The latter includes SOD, the state of the local district, and COM, committee status. Finally, the variables that influence the decision of a senator to run for reelection to the Senate, but that do not enter the Senate election probability function, include only variables that influence the values of post-congressional career options, since senators do not have a third option in our model.

[40] The argument for identification of the fraction of skilled politicians is similar. If, conditional on observed state variables, election outcomes are *i.i.d.* when we look within politicians' histories over time, there would be no evidence that some politicians are more skilled at winning elections than others. But persistently "good" outcomes for a politician over time (relative to predicted outcomes based on observed state variables) imply that the politician is "skilled."

parameters that capture nonmonetary rewards (from sitting in Congress, running for office, committee assignments, achievements, and post-congressional political jobs) are left as free parameters to help fit the wide array of conditional choice frequencies we observe in the data (i.e., the probabilities of running for reelection or higher office, conditional on a politician's history and the political climate, and the probabilities of choosing each of the three exit options, conditional on a politician's state at exit). Obviously, the utility function parameters are massively over-identified, since the number of conditional probabilities that the model attempts to fit is enormous.

II. Data

We construct a dataset containing detailed information on careers of all House and Senate members who entered Congress from 1947 (the 80th Congress) to 1993 (the 103rd Congress). Our data end in 1994, so we have complete histories of members who left Congress before January 1995. But histories are right-censored for members who, in 1994, were reelected to serve in the 104th Congress.

We define a career as uninterrupted service in Congress. A career is terminated the first time a member leaves Congress and either chooses some other full-time occupation (either in the private or the public sector), retires from professional life, or dies. If a member has multiple spells or interrupted service—an event that occurs in less than 5 percent of the cases—only the first spell is recorded. Individuals in our data set may serve only in the House; or in both the House and then the Senate (uninterrupted); or only in the Senate. Our final sample contains 1,899 career histories.[41]

For each individual in our sample, the dataset contains: (a) biographical data (i.e., age, place of birth, educational background, family background, party affiliation, prior political experience) and the record of congressional service; (b) a record of committee membership, possible scandals while serving in Congress, and congressional wages; (c) redistricting and congressional opportunities data (i.e., opportunities to run for a Senate seat, seat vacant or incumbent present, party affiliation of the incumbent); (d) a record of important legislative accomplishments (i.e., sponsoring major pieces of legislation, delivering famous speeches, casting decisive votes on important issues); and (e) post-congressional data (i.e., type of first job after service, first annual salary, pension benefits). We describe the data in more detail and discuss our data sources in Diermeier et al. (2004).

Of the 1,899 people in our sample, 89 percent begin their congressional career in the House while 11 percent start in the Senate; 95 politicians die in office; and 413 are still in Congress at the end of our sample period. Of the 1,684 politicians who enter Congress in the House, 172 run for a Senate seat at some point in their career, and 58 succeed. During our sample period, there are 73 major scandals (66 involving a House member), 2,167 cases where a House member is affected by redistricting,[42] and 270 important legislative accomplishments (133 by House members). As Democrats controlled the House during almost the entire sample period, they account for 56 percent of the sample. While 86 percent of the politicians in our sample have a bachelor's degree, nearly half (49 percent) do not have a law degree.

We have post-congressional career information on 1,141 of the 1,391 members who exit Congress during our sample period. Of these, 52 percent enter the private sector, 35 percent take another political job, and 13 percent retire. In 720 cases, we have information on their salary or pension. The average annual salaries of former members of Congress in the private and public sectors (in 1995 dollars) are $252,583 and $122,576 (with standard deviations of $67,392 and $43,319), respectively.

There are five variables we use in estimation that we did not discuss in the model section.

[41] Ambiguous entries (e.g, missing information on a person's middle name may prevent us from distinguishing members with the same first and last name) and observations with inconsistent or incomplete congressional records were dropped from the data. Members who serve in the Senate and then in the House—an extremely rare event—are also dropped.

[42] Although most redistricting activity occurs after a decennial census, some redistricting occurs every election year because of State Supreme Court rulings. Note that a single redistricting may affect many representatives.

HSE is a dummy equal to 1 if a member starts his/her career in the House, and, conversely, Enter Senate is a dummy equal to 1 if the person starts in the Senate. Age at Entry indicates the member's age upon entering Congress. Family is an indicator for whether an individual has relatives who had served in Congress, Home is an indicator for whether an individual serves in the same state where he/she was born, and Polexp is an indicator for whether an individual had political experience prior to entering Congress.

The variables Family, Home, Polexp, Enter Senate, and Age at Entry are not state variables in our model. We use them, however, together with party affiliation, to help predict the unobservable type of a politician. Specifically, we assume that the probability that $\text{Skill}_i = 1$ and the probability that $\text{Achieve}_i = 1$ are logistic functions of these six variables. This allows us, for example, to shed light on whether political experience prior to service in Congress, or coming from a "political family," are positively correlated with political skills, or whether a politician who enters the Senate directly or who is a member of a particular party is more likely to value legislative accomplishments.

A large fraction of the sample (68 percent) serves in the same state where they are born, and a vast majority (78 percent) held another local, state, or federal office prior to service in Congress. Only a small fraction (6 percent) had relatives elected to Congress before them. On average, a member of the U.S. Congress starts his or her congressional career at age 48.

III. Results

In this section, we summarize our estimates and our main empirical findings, discussing each component of the model in turn. The maximum likelihood estimates (and standard errors) of the model parameters are reported in Table 2. For a detailed discussion of how we solve and estimate the model (including the likelihood function), see Diermeier et al. (2004).

A. *Probabilities of Winning, Committee Assignments, and Legislative Achievements*

Several interesting results emerge from the estimated probabilities of winning House elections, winning Senate elections, and being named to a major House committee. Accumulated experience or seniority in the House (measured by the number of terms in the House), significantly affects the probability of winning reelection in the House, the probability of being named to a major House committee, and the probability of winning a bid for a Senate seat. On the other hand, accumulated experience or seniority in the Senate (measured by the number of terms in the Senate), does not significantly affect the probability of winning reelection in the Senate. Holding everything else constant, age also has a significant effect on all these probabilities, indicating that general experience may also be a factor. Prior committee status (captured by the indicator variable COM_{t-1}) is a strong predictor of the probability of being named to a major House committee, indicating a high degree of persistence in the composition of such committees (as is consistent with a seniority norm). Being a member of a major committee also increases the reelection probability in the House. Negative events, like scandals (either for a senator or a House representative) or redistricting (for a House representative), significantly reduce the probability of winning an election.

Unobserved heterogeneity in ability, captured by Skill = 0 or 1, plays an important role in determining politicians' electoral chances in both chambers of Congress. On average, our estimates imply that a House member who is a "skilled" politician (e.g., one with a valence or charisma advantage), has a 97.4-percent chance of winning a reelection bid in the House, compared to an 83.5-percent victory probability for a "normal" type.[43] Similarly, a senator who is a skilled politician has, on average, an 87.6-percent chance of winning a reelection bid in the Senate, compared to only a 64.4-percent victory probability for a normal type. And a skilled politician in the House has, on average, a 24.4-percent chance of winning a bid for the Senate, compared to only a 7.5-percent chance for a normal type.

[43] These figures are obtained by averaging over all states that occurred in the data. These are unconditional probabilities, in the sense that observations are included in the average regardless of whether the politician actually chose to run.

TABLE 2—MAXIMUM LIKELIHOOD ESTIMATES AND STANDARD ERRORS

Variable	Estimate	Standard error
Panel A: Probability of winning in the House		
Intercept	−3.7193	0.3541
I[SOW = 1]*I[Party = R]	0.8858	0.2870
I[SOW = 2]*I[Party = D]	0.8904	0.1609
I[SOW = 3]*I[Party = D]	1.2112	0.1825
I[SOW = 3]*I[Party = R]	−1.3936	0.1801
I[SOS = 1]*I[Party = D]	−2.3441	0.3487
I[SOS = 1]*I[Party = R]	0.9529	0.2794
I[SOS = 2]*I[Party = D]	−1.6466	0.3165
I[SOS = 3]*I[Party = D]	−0.9674	0.2951
I[SOS = 3]*I[Party = R]	−0.6420	0.2889
I[SOD = 1]*I[Party = R]	1.1560	0.2509
I[SOD = 2]*I[Party = D]	0.5690	0.1879
I[SOD = 3]*I[Party = D]	2.2821	0.2692
I[SOD = 3]*I[Party = R]	0.0122	0.2734
TH	0.2989	0.0569
TH^2	−0.0114	0.0036
COM	0.3608	0.1776
Age	0.2574	0.0089
Age^2	−0.0032	0.0001
I[Cohort = 2]	0.9910	0.3148
I[Cohort = 2]*TH	0.2047	0.2642
I[Cohort = 2]*TH^2	−0.3385	0.1239
I[Cohort = 3]	0.3240	0.1485
I[Cohort = 3]*TH	0.0263	0.0104
I[Cohort = 3]*TH^2	−0.0594	0.0175
Skill	2.4777	0.2909
Redist	−0.2782	0.1250
Scandal	−4.7276	0.4808
Panel B: Probability of winning in the Senate		
Intercept	0.1523	0.3622
I[SOW = 1]*I[Party = R]	−0.0737	0.1468
I[SOW = 2]*I[Party = D]	0.5035	0.1853
I[SOW = 3]*I[Party = D]	0.5922	0.1962
I[SOW = 3]*I[Party = R]	−0.4537	0.1828
I[SOS = 1]*I[Party = D]	0.0024	0.3142
I[SOS = 1]*I[Party = R]	0.6365	0.2139
I[SOS = 2]*I[Party = D]	0.0013	0.3095
I[SOS = 3]*I[Party = D]	−0.2119	0.3175
I[SOS = 3]*I[Party = R]	−0.0497	0.2274
I[ES = 2]*I[Party = D]*HSE	−4.9166	0.4249
I[ES = 2]*I[Party = R]*HSE	−3.5031	0.3585
I[ES = 3]*I[Party = D]*HSE	−4.1020	0.3767
I[ES = 3]*I[Party = R]*HSE	−4.5837	0.4788
I[ES = 4]*I[Party = D]*HSE	−3.6156	0.3750
I[ES = 4]*I[Party = R]*HSE	−3.0244	0.3679
TH*HSE	0.3217	0.0744
TH^2*HSE	−0.0329	0.0083
TS	−0.0819	0.3792
TS^2	0.0535	0.0855
Age	0.0861	0.0077
Age^2	−0.0014	0.0001
Skill	1.5194	0.3482
Scandal	−2.4383	1.4305

Variable	Estimate	Standard error
Panel C: Probability of committee appointment		
Intercept	−8.2046	0.3149
I[SOW = 1]*I[Party = R]	0.1106	0.1958
I[SOW = 2]*I[Party = D]	−0.6282	0.1748
I[SOW = 3]*I[Party = D]	−0.2920	0.1658
I[SOW = 3]*I[Party = R]	0.3350	0.1927
I[SOS = 1]*I[Party = D]	0.9235	0.3206
I[SOS = 1]*I[Party = R]	0.5262	0.2625
I[SOS = 2]*I[Party = D]	0.8245	0.3145
I[SOS = 3]*I[Party = D]	0.8414	0.2792
I[SOS = 3]*I[Party = R]	0.0842	0.2735
I[SOD = 1]*I[Party = R]	0.3074	0.2210
I[SOD = 2]*I[Party = D]	0.2082	0.1708
I[SOD = 3]*I[Party = D]	0.0892	0.1992
I[SOD = 3]*I[Party = R]	−0.1118	0.2519
I[COM$_{t-1}$ = 1]*TH	0.1679	0.1002
I[COM$_{t-1}$ = 1]*TH^2	−0.0067	0.0059
I[COM$_{t-1}$ = 0]*TH	0.3422	0.0670
I[COM$_{t-1}$ = 0]*TH^2	−0.0498	0.0062
COM$_{t-1}$	5.8834	0.4238
Age	0.1864	0.0080
Age^2	−0.0019	0.0001
Panel D: Probability of achievement in the House		
Intercept	−3.2931	0.1856
TH	0.1254	0.0176
COM	−0.0709	0.2252
I[Party = D]	0.6896	0.2121
Panel E: Probability of achievement in the Senate		
Intercept	−1.9139	0.2307
TS	0.2081	0.0835
I[Party = D]	0.2454	0.1842
Panel F: Wage function in the private sector		
Intercept	11.8478	0.0474
BA	0.0633	0.0276
JD	0.0367	0.0195
TH	0.0503	0.0071
TH^2	−0.0030	0.0005
TS	0.2952	0.0542
TS^2	−0.0642	0.0154
COM	0.0296	0.0433
VE	−0.0849	0.0235
Age	0.0081	0.0011
Age^2	−0.0001	0.0000
Skill	−0.0286	0.0455
Panel G: Wage function in the public sector		
Intercept	10.6393	0.0832
BA	0.0915	0.0510
JD	0.0134	0.0369
TH	0.0736	0.0145
TH^2	−0.0054	0.0012

TABLE 2—*Continued.*

Variable	Estimate	Standard error
Panel G: Wage function in the public sector (*continued*)		
TS	0.4029	0.0854
TS^2	−0.1004	0.0233
COM	−0.1641	0.0865
VE	0.0042	0.0438
Age	0.0306	0.0021
Age^2	−0.0004	0.0000
Skill	−0.0968	0.0821
Panel H: Covariance matrix of wage error terms		
a_{11}	0.3710	0.0260
a_{12}	0.4409	0.0292
a_{22}	0.0000	—
Panel I: Probability of being "skilled"		
Intercept	−0.5816	0.5130
Family	0.4046	0.3775
Home	0.1562	0.1915
Polexp	0.3525	0.2098
Enter Senate	−0.0165	0.9852
Age at entry	0.0664	0.0346
I[Party = *D*]	0.3862	0.2803
Panel J: Probability of being an "achiever"		
Intercept	−0.0688	0.5087
Family	0.7526	0.5209
Home	0.0306	0.2726
Polexp	−0.3894	0.2976
Enter Senate	1.5118	0.3554
Age at entry	−0.1472	0.0331
I[Party = *D*]	−0.2396	0.2977
Panel K: Utilities from sitting in Congress		
a_H	40,732	23,254
a_C	27,304	16,749
a_S	424,619	84,974
Panel L: Utilities from legislative achievements		
a_{AH}	338,517	118,556
a_{AS}	403,982	288,756
Panel M: Utilities from running		
a_{RH}	228,586	22,047
a_{HS}	−658,739	103,034
a_{RS}	327,109	286,312
Panel N: Utilities on exit		
a_L	253,917	9,403
a_{VE}	63,499	9,505
a_{2W}	178,031	9,202
a_{1C}	−21,399	14,308
a_{2C}	15,055	12,424
Panel O: Standard deviations of taste shocks		
ρ_{1H}	217,375	22,901
ρ_{2H}	216,585	22,329
ρ_{3H}	215,420	22,679
ρ_{4H}	212,478	25,421
ρ_{1S}	388,701	78,244
ρ_{2S}	526,056	110,430
ρ_{RS}	902,362	230,618
ρ_E	98,240	18,312
Panel P: Probability of retirement and discount factor		
Intercept	2.3963	1.5649
Age − 60	−1.0424	0.4590
δ	0.8488	0.0216

Notes: The value of the log-likelihood is −8371.84. *I*[.] is an indicator variable that takes the value 1 if the expression within brackets is true and 0 if it is false.

The political climate variables enter the probability of winning functions in a very flexible way (see Table 2). To help interpret their impact, we present some examples. Consider a 48-year-old Democrat who is serving his/her first House term in the 100th Congress, is not on a major committee, faces no scandal or redistricting, and is a normal type (i.e., Skill = 0). Suppose SOD, SOS, and SOW, which we assume can take on values 1, 2, or 3, as the political climate is favorable for Republicans, neutral, or favorable for Democrats (see Diermeier et al., 2004), all equal 2, implying a neutral climate. Then, our estimates imply that the probability of winning a House reelection bid is 86.5 percent. But, if SOD, SOS, and SOW all equal 1, meaning the climate favors Republicans, this probability drops to only 42.5 percent; if SOD, SOS, and SOW all equal 3, meaning the climate favors Democrats, it increases to 99 percent.

Now suppose an open Senate seat (i.e., no incumbent running) is up for election in this representative's state. Then, if SOD, SOS, and

SOW all equal 2 (i.e., the climate is neutral), his/her chance of winning a Senate bid is 14.8 percent. If the three climate variables all favor Republicans, it falls to 9.5 percent. Presence of an incumbent reduces the probability of a successful Senate bid even more. For instance, even if all the climate variables favor Democrats, the chance of a successful Senate bid against an incumbent Democratic senator is only 4 percent.

As we have discussed, ignoring the fact that members of Congress may decide whether to run for reelection based, at least in part, on their probability of success may lead to selection bias in estimates of reelection probabilities. But our model adjusts victory probability estimates by taking into account how members of Congress decide whether to run. To assess the impact of selection on observed victory probabilities, we simulate career histories from our model and compare average victory probabilities between politicians who choose to run and those who do not run.

Our model implies that the average probability of winning reelection to the House among members who choose to run is 90.7 percent, while the average victory probability among those who do not run is 88.1 percent. Unconditionally, the victory probability is 90.4 percent. These figures are open to different interpretations. Obviously, there is selection, in that victory probabilities are higher among House members who decide to run for reelection. On the other hand, the difference is modest, and the unconditional victory probability is nearly as high as the probability conditional on running. We conclude that very high House reelection probabilities are a real phenomenon, and not an artifact of selection. The pattern is similar in the Senate. Our model implies that the average victory probability among senators who choose to run for reelection is 81.8 percent, while the average victory probability among those who choose not to run is 75.5 percent. Unconditionally, the victory probability is 80.8 percent.

Selection is much more quantitatively important for the probability of winning a bid for higher office. Our model implies that the average victory probability among House members who actually make a bid for a Senate seat is 36.6 percent. But the unconditional probability of winning a bid for the Senate is only 16.3 percent. This suggests that decisions of representatives about whether to run for higher office are quite sensitive to their chances of success.

Turning to the estimated probability of important legislative achievements by representatives and senators, we find that accumulated experience (i.e., seniority) increases the probability of a personal legislative achievement in both chambers. Committee membership, on the other hand, has no significant effect. Interestingly, Democrat representatives and senators are more likely to obtain important legislative accomplishments than Republicans. This may be because Democrats controlled both chambers of Congress during most of our sample period.

B. *Post-Congressional Wage Functions*

Our wage functions estimates allow us to quantify the job-market returns to congressional experience, which is one of the primary goals of our research. Our findings indicate that congressional experience significantly increases wages in post-congressional occupations both in the private and in the public sector. The marginal effect of an additional term in Congress, however, decreases rather rapidly with experience. Holding everything else constant, winning reelection in the House (Senate) for the first time increases post-congressional wages by 4.4 percent (16.7 percent) and 6.3 percent (20.2 percent) in the private and public sectors, respectively. But averaging over members' actual experience levels, the marginal effect on post-congressional wages of an additional term in the House (Senate) is equal to 2.4 percent (5.2 percent) in the private sector and 2.6 percent (2.4 percent) in the public sector.

Several additional observations are noteworthy. All other coefficients of the wage functions have reasonable signs and magnitudes. Interestingly, leaving Congress voluntarily is associated with *lower* wages in the private sector (but not in the public sector). As we alluded to earlier, this effect may arise because leaving Congress voluntarily indicates a politician's desire to "slow down," which would induce him/her to pursue lower-paying but also less-demanding jobs in the private sector. On the other hand, leaving as a "loser" may preclude a

member of Congress from pursuing some other political offices.

An important finding is that a politician's unobserved skill-type has no effect on post-congressional wages either in the private or public sector. Politicians' unobserved attributes, such as valence or charisma, which, as illustrated above, play an important role throughout their congressional careers by increasing their probability of winning elections, do not seem to translate directly into better job-market opportunities outside of Congress. Thus, skilled politicians are not more productive in post-congressional employment.[44]

C. *Utility Function and Unobserved Heterogeneity*

The estimated utility function parameters imply that monetary rewards alone (i.e., congressional wages and post-congressional payoffs) cannot explain the behavior of members of Congress. Politicians also care about nonpecuniary rewards. Our model enables us to place a monetary value on the nonpecuniary rewards from serving in Congress and, to some extent, to decompose them by quantifying the benefits from important political accomplishments. We find that general nonpecuniary rewards amount to over $200,000 per year for a senator and about $20,000 to $35,000 per year for a representative, depending on whether he/she is a member of a major House committee. Nonpecuniary rewards from achieving an important legislative accomplishment are comparable for representatives and senators and are both quite large (i.e., about $350,000 and $400,000, respectively).[45] To provide a term of comparison, note that the average annual salary of a member of Congress in 1995 dollars over our sample period is equal to $120,378.[46] We conclude that the nonpecuniary rewards from being in Congress are rather large (especially in the Senate) and that policy motivations may play an important role in the career decisions of some politicians.[47]

Turning to politicians' unobserved heterogeneity, the estimated distribution of politicians' types implies that 46 percent are the "skilled" type while 27 percent are the "achiever" type. Regarding the joint distribution, 11 percent are skilled achievers, 35 percent are skilled only, 16 percent are achievers only, and 38 percent are neither. Interestingly, politicians who are younger when they first enter Congress, and politicians who enter the Senate directly, are more likely to be achievers. Political experience prior to entering Congress and being a Democrat are both negatively correlated with being an achiever (although neither effect is statistically significant). On the other hand, politicians who are older when they first enter Congress are more likely to be skilled. Being a skilled politician is also positively correlated with being a Democrat and having prior political experience (although neither correlation is statistically significant).[48]

D. *Goodness of Fit*

Our model specification is quite parsimonious, given the number of outcomes and behavior that the model must fit (i.e., winning probabilities, committee appointments, political achievements, choice probabilities while in Congress, wages, occupational choices, and retirement after exiting Congress). The only component of the model where we obviously have a great deal of leeway in terms of specification is

[44] The finding that unobserved heterogeneity in skills does not affect the wage functions does not imply that we could have estimated these functions separately from the rest of the model using OLS. There is still selection in terms of which post-congressional career option (private sector, public sector, or retirement) is chosen. Variables like congressional experience, voluntary exit, education, and committee status will be correlated with the error terms in the wage functions among the subsamples of politicians who select particular exit options, and are therefore endogenous.

[45] Legislative achievements as we have defined them are fairly rare. In our sample period we observe only about 11 on average per Congress. On the other hand, our estimates imply that only 27 percent of politicians are the type who care about achievement. This implies that the probability of an achievement for a typical achiever is about $11/(535 \times 0.27) = 7.6$ percent per term, implying an expected value of achievements of roughly $25,000 to $30,000 per term.

[46] To convert nominal amounts into real we used the CPI deflator and set 1995 as the base year.

[47] Furthermore, the estimated nonpecuniary reward from a post-congressional political job is about $90,000 per year.

[48] However, the estimated coefficients of each of the two type probability functions are jointly significant.

in the utility function, but here we adopted a very simple specification with only 13 fundamental parameters.[49] We would argue that this is extremely parsimonious, given the need to capture both decisions while in Congress (8 dedicated parameters) and post-congressional occupational choices (5 dedicated parameters).

To assess the overall fit of our model, we present Table 3 and Figures 1 and 2, which focus on different aspects of the data on congressional careers and post-congressional decisions, and compare the predictions of the model to their empirical counterparts.[50] Overall the model tracks the behavior of politicians throughout their congressional careers remarkably well.

In the top panel of Table 3, we summarize the behavior of representatives for each possible "election status" as described by the state variable ES. Recall that ES = 1 if no Senate seat is up for election in the representative's state. If ES = 2 or 3 a Senate seat is up for election, but an incumbent Democratic or Republican senator is running for reelection. If ES = 4 the Senate seat is open. The model predicts representatives' choices in each case so accurately that, if we were to round to the nearest integer, the choice frequencies would be exact, with one exception. When there is an open Senate seat, the model predicts that 87 percent of representatives run for reelection to the House, while in the data only 85 percent run. To compensate, the model slightly under-predicts exit and the fraction of representatives who run for the Senate seat (each by 1 percent).

As we can see from Table 3, the overwhelming majority of House members run for reelection, regardless of ES. Only a small fraction of representatives choose to give up their seat in the House to run for a seat in the Senate. But the percentage that runs for higher office is about four times larger when no incumbent senator is running for reelection.

[49] Our logit functions for probabilities of winning and committee assignments have a large number of parameters, but the specifications of these functions are quite natural in light of the existing literature. Also, the specifications of the wage functions and the logit functions for probabilities of legislative accomplishments and type probabilities are very simple.

[50] The model predictions are based on 10,000 simulated individuals with the same distribution of initial conditions as in the data.

TABLE 3—DECISIONS OF MEMBERS OF CONGRESS

	Data	Model
Panel A: Decisions of representatives		
ES = 1		
Percent rerun for House	93.15	92.99
Percent exit Congress	6.85	7.01
ES = 2		
Percent rerun for House	91.06	90.84
Percent run for Senate	2.15	2.25
Percent exit Congress	6.79	6.91
ES = 3		
Percent rerun for House	91.12	91.23
Percent run for Senate	2.34	2.30
Percent exit Congress	6.54	6.47
ES = 4		
Percent rerun for House	84.76	86.77
Percent run for Senate	8.42	7.44
Percent exit Congress	6.82	5.79
Panel B: Decisions of senators		
ST = 1		
Percent stay in Senate	98.17	97.96
Percent exit Congress	1.83	2.04
ST = 2		
Percent stay in Senate	95.34	95.38
Percent exit Congress	4.66	4.62
ST = 3		
Percent rerun for Senate	83.85	85.24
Percent exit Congress	16.15	14.76
Panel C: Post-congressional career decisions		
VE = 1		
Percent private sector	41.61	39.63
Percent public sector	35.00	30.86
Percent retire	23.39	29.51
VE = 0		
Percent private sector	61.27	55.53
Percent public sector	35.11	39.63
Percent retire	3.61	4.83

In the middle panel of Table 3, we summarize the behavior of senators for each possible value of ST ("Senate term"), which is equal to 1, 2, or 3 as the senator has served 2, 4, or the full 6 years of his/her term, respectively. Again the predictions of the model are very accurate. The probability a senator runs for reelection is slightly overstated (85 percent versus 84 percent in the data). Note that the fraction of senators who run for reelection is much smaller than that for representatives, but still very high.

In Figures 1 and 2, we plot the survival functions for members of the House and the Senate, respectively. As we can see from these figures, the model accurately predicts the ob-

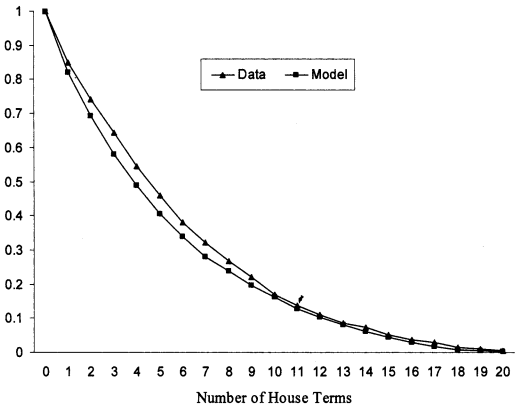

FIGURE 1. SURVIVAL FUNCTION FOR HOUSE

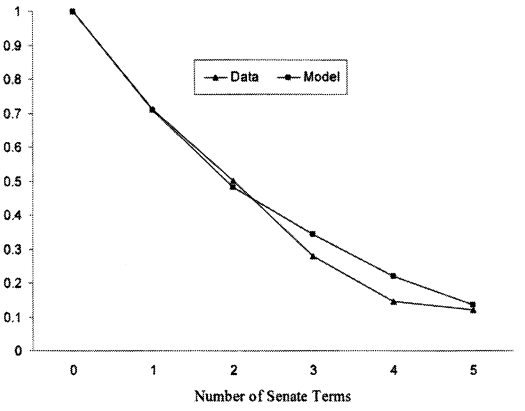

FIGURE 2. SURVIVAL FUNCTION FOR SENATE

served career decisions of politicians through time in both chambers of Congress.[51] Another interesting feature of the data is that the members of the House who choose to run for the Senate do so relatively early in their careers as representatives. If a representative does not run for the Senate by about his/her fifth term, he/she is very unlikely to ever do so. The model accurately captures this pattern as well.

In the bottom panel of Table 3, we describe the fit to post-congressional career decisions. We distinguish between politicians who leave Congress voluntarily (i.e., VE = 1) and those who are forced out via losing an election (i.e., VE = 0), because their behavior is rather different. By and large, the model reproduces post-congressional career choices reasonably well, although not as well as it captures behavior while in Congress. We understate the fraction of voluntary leavers who enter the public sector (31 percent versus 35 percent in the data), and overstate the fraction who retire (29.5 percent versus 23.3 percent). And we understate the fraction of "losers" who enter the private sector (55.5 percent versus 61.3 percent in the data), while overstating the fraction who enter the public sector (39.6 percent versus. 35.1 percent). But the model does generate the patterns that voluntary leavers are much more likely to retire than "losers,"[52] and that voluntarily leavers are much less likely to enter the private sector. This is consistent with our finding that voluntarily leavers are offered lower private sector wages.

IV. The Value of a Seat in Congress

In this section, we use our model to assess the value of a seat in Congress. Much of the recent literature on retirements from Congress has focused on monetary incentives, such as the option of converting unspent campaign funds to personal use (see Groseclose and Krehbie, 1994; Groseclose and Milyo, 1999). Our model allows us to address the following more general question: What monetary payment (contingent on exit) would render a member of Congress ex ante indifferent between giving up his/her seat prior to the expiration of his/her current term and continuing his/her congressional career? Let Value_{it} denote the answer to this question for politician i at time t. We interpret this as the monetized value of a seat in Congress for a sitting member. Using our model, this value can be easily calculated and is equal to the ex ante difference between the value function of remaining in Congress and the value function of

[51] In the data, conditional on being elected to the House, the average number of terms a representative serves before exiting Congress is 4.9. The comparable figure for senators is 1.9 terms. The average numbers of House and Senate terms predicted by the model are equal to 4.5 and 2.1, respectively.

[52] The fraction of politicians who leave Congress voluntarily is 47.3 percent, while the model predicts 43.3 percent.

voluntarily exiting Congress.[53] In particular, for a sitting House member we have:

$$\text{(14)}\quad \text{Value}_{it} = \begin{cases} \bar{V}_{\text{RH}}(\text{XH}_{it}, h) - V_E(\text{XP}_{it}) & \text{if ES} = 1 \\ \max\{\bar{V}_{\text{RH}}(\text{XH}_{it}, h), \bar{V}_{\text{RS}}(\text{XH}_{it}, h)\} - V_E(\text{XP}_{it}) & \text{if ES} = 2, 3, 4 \end{cases}$$

while for a sitting member of the Senate we have:

$$\text{(15)}\quad \text{Value}_{it} = \begin{cases} \bar{V}_S(\text{XS}_{it}, s) - V_E(\text{XP}_{it}) & \text{if ST} = 1, 2 \\ \bar{V}_{\text{RS}}(\text{XS}_{it}, s) - V_E(\text{XP}_{it}) & \text{if ST} = 3. \end{cases}$$

The mean and standard deviation of the monetized value of a House seat in 1995 dollars computed using our estimated model are equal to \$616,228 and \$170,415, respectively.[54] For a Senate seat, they are equal to \$1,673,763 and \$344,302, respectively.[55]

How does the value of a seat in Congress vary with individual characteristics? Table 4 reports OLS regressions of the log of the monetized value of a congressional seat, $ln(\text{Value}_{it})$, on individual characteristics (i.e., BA, JD, Age, Skill, Achieve, and Party), congressional experience, and the estimated probability of winning reelection, for members of the House and the Senate, respectively. Several interesting findings emerge from this table. As we would expect, *ceteris paribus*, individual characteristics that increase the outside opportunities of a member of Congress (like having a BA or a JD) lower the value of a seat in Congress. On the other hand, being a "skilled" politician (or an "achiever") increases the value of a House seat by 19 percent (13 percent) and that of a Senate seat by 15 percent (16 percent). For a House member, being on a major committee increases the value of a House seat by 15 percent. Holding everything else constant, a 1-percent increase in the probability of winning reelection in the House (Senate) translates into roughly a 0.6 percent (0.8 percent) increase in the value of a congressional seat. Interestingly, the value of a Senate seat is 4.8 percent higher for Democrats.

TABLE 4—OLS REGRESSIONS OF LOG-VALUE OF A CONGRESSIONAL SEAT

Variable	Estimate	Standard error
Panel A: Value of a House seat		
Intercept	12.5797	0.0151
BA	−0.0791	0.0016
JD	−0.0334	0.0012
Age	0.0240	0.0006
Age^2	−0.0003	0.0000
TH	−0.0569	0.0005
TH^2	0.0002	0.0000
COM	0.1530	0.0015
Skill	0.1893	0.0013
Achieve	0.1312	0.0013
Democrat	−0.0027	0.0011
Winning probability	0.6474	0.0042
$R^2 = 0.8836$		
Panel B: Value of a Senate seat		
Intercept	12.1649	0.0576
BA	−0.0384	0.0054
JD	−0.0162	0.0036
Age	0.0679	0.0021
Age^2	−0.0007	0.0000
TH	−0.0494	0.0032
TH^2	0.0029	0.0006
TS	−0.0925	0.0058
TS^2	0.0129	0.0011
Skill	0.1520	0.0063
Achieve	0.1608	0.0034
Democrat	0.0476	0.0035
Winning probability	0.8045	0.0243
$R^2 = 0.9210$		

[53] Note that by ex ante we mean before the politician's taste shocks at the time of the decision to run for reelection are realized. If the ex ante value functions are equalized, there is a 50–50 chance the politician will choose to exit after the taste shocks are realized. This ex ante indifference is identical to the criterion used in Groseclose and Milyo (1999).

[54] Like all other model predictions, these values are obtained by using the model to simulate 10,000 career histories.

[55] Note that our estimates do not correspond to what individuals who are not in Congress would be willing to pay to *obtain* a seat in Congress. In fact, our counterfactual experiment holds constant any accumulated congressional experience (and the present discounted value of all future returns it is expected to generate), and simply compares the ex ante value of continuing in Congress to that of exiting prior to the termination of a congressional term. To answer the alternative question about value of entry, we would need to collect additional data on unsuccessful candidates and then model the initial decision to run for Congress. We intend to pursue this line of inquiry in future work.

It is interesting to compare our estimates of the values of House and Senate seats to those obtained using alternative approaches, particularly Groseclose and Milyo (1999). As discussed by Groseclose and Krehbiel (1994), a 1979 amendment to the Federal Election Campaign Act prohibited members of the House from transferring unspent campaign funds to personal use after they left office.[56] This amendment also contained a "golden parachute provision," however, which granted all House members elected prior to 1980 grandfather status. But a second amendment, passed into law in 1989, abolished this in 1992. Hence, in 1992, 158 members of the House were presented with a one-time choice between voluntarily exiting Congress and keeping their campaign war chests for personal use, or running for reelection and forever foregoing this opportunity.

While not directly comparable, this situation provides at least a benchmark to assess the outcome of our counterfactual experiment. In particular, from the politicians' decisions to forego specific amounts of money we can make some inference regarding properties of the distribution of the value of a House seat. Using the Groseclose and Krehbiel (1994) data, for the 158 members of the House who faced this decision, we computed descriptive statistics of the dollar amounts in their campaign war chest depending on whether they actually chose to rerun or exit Congress. The mean and standard deviation of these amounts (in 1995 CPI dollars) for the 33 members of the House who voluntarily exited Congress are $307,280 and $235,028, respectively. For the remaining 125 House members who decided to rerun, they are equal to $234,809 and $232,711, respectively. These two distributions overlap substantially, so there is obviously no clear threshold, such that a member exited if and only if the "golden parachute" exceeded that value.

Using these data, Groseclose and Milyo (1999) estimate a model of the decisions of affected House members whether to run for reelection in 1992 versus exit Congress. The amount in each member's campaign war chest provides an arguably exogenous source of variation in the value of the exit option, which helps to identify the model parameters. Groseclose and Milyo assume politicians' utility is a concave (CRRA) function of their wealth, and use imputed measures of the personal wealth of House members to estimate their utility from the convertible campaign cash.[57] Their maximum likelihood estimates imply that the value of a House seat for a member of median age and median wealth is about $3 million. The Groseclose and Milyo estimates, however, are very sensitive to the coefficient of risk-aversion in the politicians' utility function, and the likelihood function of their model is very flat in this parameter. According to Groseclose (2002) the estimate of the value of a House seat falls to only about $250,000 if they assume a linear utility function. Given the flatness of their likelihood surface, they cannot reject linear or nearly linear utility, so in fact their estimate does not strongly contradict ours.[58]

V. Policy Experiments

An appealing feature of our structural approach is that we can use the estimated model to evaluate the effects of various policy experiments on careers of politicians and the value of a congressional seat. Here, we analyze two experiments: an increase in the congressional wage and term limits.

Before we discuss these policy experiments, an important caveat is in order. Since our data contain only members of Congress, our analysis is limited to the study of politicians conditional

[56] This amendment did not affect the members of the Senate since this option was never available to them.

[57] According to their data, the average wealth of a House representative in 1992 was $350,000. Only about 5 percent had $1 million or more, and less than 2 percent had more than $5 million.

[58] A second important point is that the House members who were grandfathered by the 1979 amendment to the Federal Election Campaign Act and were still serving in 1992 were not a random sample of the population of all members of Congress. This sample includes only those members with unspent campaign funds who were not defeated and chose not to exit Congress prior to 1992. Those House members who repeatedly rejected the option of leaving during the 1980–1990 period (during which they could have exited at any time and taken the campaign cash), are likely to be members who had relatively high values of remaining in Congress. Hence, any inference based solely on their observed behavior may not generalize to the overall population.

on election to Congress. This implies that we cannot evaluate the impact of counterfactual experiments on the composition of the pool of potential candidates who choose to run for Congress in the first place. Our analysis of the effects of congressional wages and term limits is therefore only partial (i.e., it is conditional on election to Congress). Nevertheless, we believe it provides some new insights into the way such policies may affect the behavior of politicians.

A. *Congressional Wage Increase*

The first experiment we consider is a 20-percent increase in congressional wages (in real terms). Our main finding is that the effects of such a wage increase on the behavior of members of Congress are modest. Averaged over all relevant states, the probability a House member runs for reelection increases from 91.2 percent to 94.2 percent, and the probability a senator runs increases from 85.2 percent to 87.1 percent.[59] For the members of the House, the probability of running for the Senate (conditional on a seat being up for election) decreases slightly from 3.0 percent to 1.9 percent. Overall, the wage increase reduces early voluntary exit from Congress only by about 2 percent, and has virtually no effect on the overall average duration of congressional careers or the post-congressional decisions of politicians. These effects are fairly similar across politicians with different (observable and unobservable) characteristics.

Turning our attention to the effects of an increase in the congressional wage on the value of a congressional seat, we find that a 20-percent wage increase boosts the average value of a seat in the House by 22.9 percent and the average value of a seat in the Senate by 9.8 percent.[60] This difference can be explained by the fact that, while the congressional wage is the predominant component of the per-period expected payoff from serving in the House, it accounts for a much smaller portion of the per-period expected payoff from serving in the Senate.

Recently, political economists have started to investigate the idea that paying politicians better may improve the average quality of politicians and their performance in office (see, e.g., Timothy Besley, 2004). Our analysis suggests that while a pay raise clearly increases the value of holding office, the effects of congressional wages on the career decisions of sitting members of Congress are uniformly small, for all types of politicians.

B. *Term Limits*

In the second policy experiment, we consider a term limit regime where politicians can serve a maximum of four terms in the House and two terms in the Senate. This situation corresponds to an actual proposal that was considered in the early 1990s. In fact, between 1990 and 1994, many states approved initiatives to limit the number of terms served by their state legislators and proposed to extend these limits to their members of Congress (see, e.g., Gerald Benjamin and Michael Malbin, 1992).[61]

Perhaps not surprisingly, we find that the presence of term limits substantially increases early voluntary exit from both the House and the Senate.[62] Averaged over all relevant states, the probability a House member runs for reelection (to a second or third term) drops from 93.6 percent to 81.9 percent, and the probability a senator runs for a second term drops from 87.0 percent to 77.1 percent. For House members, imposition of term limits increases their probability of running for the Senate from 2.9 percent to 6.7 percent.[63]

[59] All statistics reported in Section V are based on simulations of 10,000 career histories using our estimated model.

[60] Note that the effect of a 20-percent wage increase on the value of a seat can exceed 20 percent so long as the value of the outside alternative is positive. Effects of less than 20 percent will tend to arise if nonpecuniary returns are a large part of the value of a seat. The effect estimates we obtain are fairly homogeneous across politicians with different observed characteristics and unobserved types.

[61] These proposals range from imposing limits of as little as three to as many as six terms in the House. In our analysis, we experimented with all possible combinations. Qualitatively, the results were similar across all the different cases.

[62] We compare the choices of House and Senate members under the two different scenarios prior to their fourth House term and their second Senate term, respectively (when, under the term limit scenario, they would have to exit Congress).

[63] These findings are consistent with the observed behavior of state legislators following the introduction of term

A perhaps more interesting question, however, is whether term limits have an impact on all individuals in the same way, or whether politicians with different characteristics are affected differently. We find that term limits have slightly larger impacts on the behavior of more skilled politicians, politicians who place more value on political achievements, and politicians who are older. These differences are more noticeable in the House, although we also find them in the Senate. On average, the imposition of term limits reduces the probability that a politician of normal type runs for reelection (to a second or third term) in the House by about 10 percent. But for "skilled" politicians and "achievers" the declines are about 13 percent and 12 percent, respectively. Differences are also apparent by age. On average, the imposition of term limits reduces the probability that a relatively young politician (i.e., under or equal to the mean age of 48) runs for reelection to a second or third term in the House by about 11 percent. But for an older politician this probability goes down by about 13 percent.[64]

Turning to the effects of term limits on the value of a congressional seat, we find that the imposition of term limits reduces the average value of a House seat by 39.8 percent and the average value of a Senate seat by 26.2 percent. Consistent with our previous findings, the members of Congress who are most negatively affected by term limits are those who have better politicians' skills, value personal political achievements more, and are older. For example, while term limits reduce the value of a House (Senate) seat for a politician of normal type by about 37 percent (20 percent), the reductions for a "skilled" politician and an "achiever" are equal to about 42 percent (29 percent) and 41 percent (27 percent), respectively.

Many *pro* and *con* arguments for legislative term limits have been made (see, e.g., Benjamin and Malbin, 1992, for a survey). Many have emphasized that, since reelection prospects create incentives for politicians to serve their constituents, imposing term limits may induce politicians to exercise less effort on behalf of their voters (see, e.g., Besley and Anne Case, 1995; Jeffrey S. Banks and Rangarajan K. Sundaram, 1998). The results of our analysis suggest that another potential effect of term limits is that they may discourage relatively "skilled" politicians and politicians who are relatively more "policy minded" from staying in Congress. Our results also suggest that term limits might tend to tilt the composition of Congress toward younger and less experienced politicians.

VI. Conclusions

In this article, we have presented a novel approach to the empirical analysis of political careers based on the specification and estimation of a dynamic model of the career decisions of members of the U.S. Congress. Using a newly constructed dataset that contains information on post-congressional employment, we have estimated the returns to congressional experience, quantified the value of a congressional seat, decomposed the overall returns to congressional service between monetary and nonpecuniary rewards, and related part of the nonpecuniary benefits from serving in Congress to data on important legislative achievements. By allowing for unobserved heterogeneity in the skills and motivations of politicians, we have estimated the frequency distribution of politician types, related the unobserved types to observable characteristics, and investigated the role of politicians' unobserved attributes in their congressional and post-congressional careers. We have also used our estimated model to assess the effects of an increase in the congressional wage and the imposition of term limits on the behavior of elected politicians.

While our analysis extends and generalizes most of the existing empirical literature on the study of political careers, there are several important issues we have neglected to address in this article which represent possible directions for future research. One issue concerns the initial decisions of politicians to run for Congress or, more broadly, the decisions of people to become politicians. Progress on successfully addressing this question critically hinges on the collection of new data on the pool of potential

limits in the California state legislature in 1994 (see, e.g., Stanley M. Caress, 1996).

[64] We find that the imposition of term limits has no significant effects on the post-congressional behavior of politicians.

candidates for public office. Another important issue concerns the role of fundraising and campaigning in political careers. An extension of our model, which incorporates these important aspects of politics, could, for example, be used to address the interesting question of whether the intense fundraising and campaigning necessary to run for Congress serves as a deterrent to "public spirited" politicians, and tends toward an adverse selection of "political dealmakers" who are beholden to lobbyists and special interests. Such a model could also be used to assess the potential effects of various campaign finance reforms like the ones that have recently been proposed in the United States.

REFERENCES

Alesina, Alberto. "Credibility and Policy Convergence in a Two-Party System with Rational Voters." *American Economic Review*, 1988, *78*(4), pp. 796–805.

Aragones, Enriqueta and Palfrey, Thomas R. "Mixed Equilibrium in a Downsian Model with a Favored Candidate." *Journal of Economic Theory*, 2002, *103*(1), pp. 131–61.

Banks, Jeffrey S. and Sundaram, Rangarajan K. "Optimal Retention in Agency Problems." *Journal of Economic Theory*, 1998, *82*(2), pp. 293–323.

Bauer, Monica and Hibbing, John R. "Why Incumbents Lose in House Elections: A Response to Jacobson's 'The Marginals Never Vanished'." *American Journal of Political Science*, 1989, *33*(1) pp. 262–71.

Benjamin, Gerald and Malbin, Michael, eds. *Limiting legislative terms.* Washington, DC: Congressional Quarterly Press, 1992.

Besley, Timothy. "Paying Politicians: Theory and Evidence." *Journal of the European Economic Association*, 2004, *2*(2–3), pp. 193–215.

Besley, Timothy and Case, Anne. "Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits." *Quarterly Journal of Economics*, 1995, *110*(3), pp. 769–98.

Besley, Timothy and Coate, Stephen. "An Economic Model of Representative Democracy." *Quarterly Journal of Economics*, 1997, *112*(1), pp. 85–114.

Caress, Stanley M. "The Impact of Term Limits on Legislative Behavior: An Examination of a Transitional Legislature." *Political Science and Politics*, 1996, *29*(4), pp. 671–76.

Deering, Christopher J. and Smith, Steven S. *Committees in Congress.* Washington, DC: Congressional Quarterly Press, 1990.

Diermeier, Daniel; Keane, Michael and Merlo, Antonio. "A Political Economy Model of Congressional Careers: Supplementary Material." Penn Institute for Economic Research , University of Pennsylvania, Working Paper No. 04–38, 2004 (http://www.econ.upenn.edu/Centers/pier/Archive/04–038.pdf).

Downs, Anthony. *An economic theory of democracy.* New York: Harper Collins, 1957.

Eckstein, Zvi and Wolpin, Kenneth I. "The Specification and Estimation of Dynamic Stochastic Discrete Choice Models: A Survey." *Journal of Human Resources*, 1989, *24*(4), pp. 562–98.

Groseclose, Timothy. "A Model of Candidate Location When One Candidate Has a Valence Advantage." *American Journal of Political Science*, 2001, *45*(4), pp. 862–87.

Groseclose, Timothy. Personal Communication, 2002.

Groseclose, Timothy and Krehbiel, Keith. "Golden Parachutes, Rubber Checks, and Strategic Retirements from the 102nd House." *American Journal of Political Science*, 1994, *38*(1), pp. 75–99.

Groseclose, Timothy and Milyo, Jeff. "Buying the Bums Out: What's the Dollar Value of a Seat in Congress?" Unpublished Paper, 1999.

Hall, Richard L. and Van Houweling, Robert P. "Avarice and Ambition in Congress: Representatives' Decisions to Run or Retire from the U.S. House." *American Political Science Review*, 1995, *89*(1), pp. 121–36.

Heckman, James J. "Sample Selection Bias as a Specification Error." *Econometrica*, 1979, *47*(1), pp. 153–61.

Heckman, James J. and Honore, Bo E. "The Empirical Content of the Roy Model." *Econometrica*, 1990, *58*(5), pp. 1121–49.

Hibbing, John R. *Congressional careers: Contours of life in the U.S. House of Representatives.* Chapel Hill: University of North Carolina Press, 1991.

Jacobson, Gary. "The Marginals Never Vanished: Incumbency and Competition in Elections to the House of Representatives, 1952–

1982." *American Journal of Political Science*, 1987, *31*(1), pp. 126–41.

Keane, Michael P. and Wolpin, Kenneth I. "The Career Decisions of Young Men." *Journal of Political Economy*, 1997, *105*(3), pp. 473–522.

Kiewiet, D. Roderick and Zeng, Langche. "An Analysis of Congressional Career Decisions, 1947–1986." *American Political Science Review*, 1993, *87*(4), pp. 928–41.

Mayhew, David R. *Congress: The electoral connection.* New Haven: Yale University Press, 1974a.

Mayhew, David R. "Congressional Elections: The Case of the Vanishing Marginals." *Polity*, 1974b, *6*(3), pp. 295–317.

Mayhew, David R. *America's Congress: Actions in the public sphere–James Madison through Newt Gingrich.* New Haven: Yale University Press, 2000.

Mincer, Jacob. "Investment in Human Capital and Personal Income Distrubution." *Journal of Political Economy*, 1958, *66*(4), pp. 281–302.

Osborne, Martin J. and Slivinski, Al. "A Model of Political Competition with Citizen-Candidates." *Quarterly Journal of Economics*, 1996, *111*(1), pp. 65–96.

Rust, John. "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher." *Econometrica*, 1987, *55*(5), pp. 999–1033.

Rust, John. "Structural Estimation of Markov Decision Processes," in Robert F. Engle and Daniel L. McFadden, eds., *Handbook of Econometrics,* Vol. 4. Amsterdam: Elsevier North-Holland, 1994, pp. 3082–143.

Schlesinger, Joseph. *Ambition in politics: Political careers in the United States.* Chicago: Rand McNally, 1966.

Sinclair, Barbara. *The transformation of the U.S. Senate.* Baltimore: Johns Hopkins University Press, 1989.

Wittman, Donald A. "Candidates with Policy Preferences: A Dynamic Model." *Journal of Economic Theory*, 1977, *14*(1), pp. 180–89.