

Vote Secrecy with Diverse Voters*

DANIEL W. GINGERICH
DANILO MEDEIROS
UNIVERSITY OF VIRGINIA

August 16, 2018

Why would incumbent politicians adopt the secret ballot when doing so weakens the advantages of incumbency? Why is the secret ballot considered a democratizing reform in some settings, whereas in others it is associated with democratic backsliding? We provide theory and empirics to address these questions. Our starting point is the observation that the secret ballot had two consequences. It reduced the capacity to monitor the vote, thereby dampening the efficacy of clientelism. Yet depending on literacy and electoral rules, it could also narrow political participation. Recognizing this, we endogenize politicians' preferences over the secret ballot, concentrating on the role of their personal and constituency characteristics. Legislative roll call voting data from Brazil's Second Republic (1945-1964) is used to test our framework. Consistent with expectations, the level of literacy of legislators' supporters and the strength of their local ties strongly influenced the choice to adopt the secret ballot.

word count (excluding appendix): 11,961

*Paper presented to the Annual Meeting of the American Political Science Association, Boston, MA, August 30-September 2, 2018. The authors would like to thank Pablo Fernandez Vazquez, Simeon Nichter, Fernando Limongi, Anne Meng, David Samuels, and participants in the conferences "Moralizing the Vote in Brazil" (University of Virginia) and "The Political Economy of Corruption and Accountability (Instituto Carlos III-Juan March de Ciencias Sociales) for comments on earlier drafts of this paper.

I. INTRODUCTION

Why would incumbent politicians adopt the secret ballot when doing so weakens the electoral advantages of incumbency, such as favored access to clientelist networks and state resources? Why is it that in some settings the introduction of the secret ballot appears to be a watershed moment in a country's democratization process, whereas in others its contribution to competitive elections is much more dubious?

The current paper provides a novel game-theoretic framework and empirical evidence from mid-twentieth century Brazil to address these questions. The starting point of our analysis is the observation that the adoption of the effective secret ballot represented first and foremost a change in the nature of voting technology. This shift in technology by its very nature affected the capacity to monitor the vote. Yet its effects were not limited to this domain. Depending on extant societal conditions and the format of electoral rules, it also held the potential to transform citizens' ability to participate in the democratic process. It was an instrument that could both guarantee privacy and shape the electorate at the same time.

Departing from the premise that the secret ballot may play this dual role, our model points to a shortcoming in the widely-held view that its adoption was intended solely to ensure that electoral outcomes would reflect the autonomous will of voting age citizens. It could serve this function, but it could equally be utilized to purge voters viewed as political opponents or undesirables. This was especially the case for illiterate voters, for whom using the secret ballot could be a genuine challenge. Our model shows that the accessibility dimension of the secret ballot lends itself to a political cleavage over reform pitting modernizing disenfranchisers (those who favor a reduction in clientelism in tandem with a narrow franchise) against exploitative democrats (those who favor few restraints on clientelism and a broad franchise).

We test the expectations of our formal model against roll call voting data from Brazil's Second Republic (1945-1964). Brazil is a natural setting in which to evaluate our framework, as a large contingent of Brazilians of voting age could not read and write at the time the effective secret ballot was adopted (1955-1970). The participation of illiterates in politics was also a topic of active political debate during this period. Combining the roll call data with electoral

statistics and census data, we examine how the personal and constituency-level characteristics of Brazilian legislators affected legislative voting behavior on several different votes on the effective secret ballot (the so-called *cédula oficial*) taking place in the Chamber of Deputies during this period.

We find that the single most important predictor of legislative voting on the effective secret ballot was the literacy level of a legislator's electoral base. Legislators whose electoral bases were composed mostly by illiterate voters were inclined to reject the secret vote; those whose electoral bases were composed mostly by literate voters were inclined to embrace it. The estimated impact of literacy was not simply a by-product of socio-economic conditions conducive to clientelism: literacy exerts a statistically significant influence on voting behavior even when one conditions on factors such as landholding inequality, sectoral employment, and the size of the electorate. This is important, as it indicates that legislators' voting behavior reflected concerns about ballot accessibility for illiterates. Indeed, evidence from parliamentary debates is highly consistent with this view.

In terms of personal characteristics, we find that the capacity to activate local clientelist networks was also an important determinant of legislative voting behavior. In particular, former mayors were substantially more likely to vote against the effective secret ballot than non-former mayors. Overall, our findings underline the joint importance of both accessibility concerns and the perceived returns to clientelism in decisions to adopt the secret ballot.

II. VOTE SECRECY AND DEMOCRACY

A growing research program examines the origins of the rules of the democratic game. Referred to by political economists as the endogenous institutions agenda, this work offers a set of theoretical frameworks and empirical analyses that elucidate how factors such as demographic change and political information shape the choice of political institutions that govern elections and delimit the power of governing elites (Aghion, Alesina, and Trebbi 2004; Trebbi, Aghion, and Alesina 2008). The logic of backward induction generates the insights of the approach.

Institutional designers rationally anticipate the outcome of each political game that emerges from choosing each institution, and, given the existing constraints at the time institutions are chosen, they adopt the institution that best advances their interests (Diermeier and Krehbiel 2003).

Scholars of comparative political institutions have applied the logic of the endogenous institutions approach to great effect in recent years. Studies of two historical outcomes dominate scholarly output in this vein: the extension of the franchise and the adoption of proportional representation. The literature on franchise extension emphasizes changes in social inequality, asset structure, public health crises, and inter-elite conflict as factors contributing to the choice to broaden the electorate (Açemoglu and Robinson 2006; Boix 2003; Lizzeri and Persico 2004; Ansell and Samuels 2014). The literature on the origins of proportional representation, in turn, revolves primarily around the question of whether or not this electoral system was adopted in response to the rising electoral strength of Left parties, the seats-votes disproportionality extant under the status quo majoritarian system, or the long-term economic interests of employers (Boix 1999; Cusak, Iverson and Soskice 2007; Calvo 2009; Leeman and Mares 2014).

More recently, the endogenous institutions research program has set its sights on another key moment in the history of democracy: the adoption of the secret ballot. In general, treatments of the topic have tended to view the adoption of the secret ballot as a constitutive feature of democratization itself, in much the same way that the expansion of the franchise is viewed as an integral step for achieving a full-fledged democracy. Indeed, in a broad cross-sectional analysis of the transition to the secret ballot, one authority on democratization concludes that the political dynamics undergirding suffrage expansion and vote secrecy should be thought of as one and the same (Przeworski 2015).

This view of the secret ballot as democratic stepping stone stems from a specific interpretation of what its adoption represented: the political liberation of poor and economically dependent voters. Whereas the expansion of the suffrage granted marginalized populations the legal right to participate in elections, the secret ballot was ostensibly the vehicle for making this right meaningful. As a shield from coercion and other forms of undue influence, it is typically

held up as the central innovation in voting technology that made it possible for the downtrodden voter to cast a vote according to conscience, instead of according to the dictates of local bosses, party operatives, or employers. From this vantage point, explaining the choice for the secret ballot in effect reduces to explaining the choice to meaningfully enfranchise the poor.

Conceptualizing the choice for the secret ballot in this way makes good sense in contexts in which voter heterogeneity is primarily a function of wealth or skills acquisition. In such settings, elite preferences over the secret ballot will be driven primarily by a politician's comparative advantage in bribing or intimidating the poor. A rich set of studies examining the adoption of vote secrecy in Imperial Germany and Victorian England bear this out. Examining legislative votes on electoral reform and other aspects of the historical record, authors have found that politicians with the greatest resource advantages or with the greatest relative capacity to intimidate economically dependent voters—due to economic structures such as landholding inequality and workforce concentration—represented the reaction against reform, whereas politicians lacking these built-in advantages represented the vanguard in favor of it (Ardanaz and Mares 2013; Kasara and Mares 2017; Mares 2015; Ziblatt 2008). This pattern seems to have held in other European countries at comparable levels of social and economic development, such as Denmark (Elklit 1983). In these cases, it is straightforward to divide the extant party system into groups in favor of reform, and, *ipso facto*, democratization (Social Democrats in Germany and Denmark, Liberals in England), and groups in favor of the old system, which represented the continuance of authoritarianism in democratic guise (the various conservative parties in Germany and Denmark, Conservatives in England).

The conceptual equivalence between the forces for or against the secret ballot and those in favor of or opposed to democracy itself does not extend easily to polities where voter heterogeneity extends beyond the realm of wealth and skills acquisition. A central dimension of such heterogeneity in a number of countries when they adopted the secret ballot consisted of functional literacy. Unlike for the case of Western and Northern Europe, where universal education largely preceded the adoption of vote secrecy, in many developing countries (and in regions of industrializing countries like the US), illiteracy among politically relevant components of

the population was widespread when the secret ballot was adopted. This matters greatly in properly interpreting the effects of the secret ballot and the elite intent underlying its adoption.

Making the vote *de facto* secret, as opposed to doing so nominally through constitutional dictate, more often than not entailed the introduction of what has become popularly known as the Australian ballot (*AB*): a uniform and official ballot presenting the voter with the option to vote for any registered candidate or party, and which is distributed by electoral authorities and printed by the state at public expense. This institution is typically what students of democracy have in mind when they refer to the effective secret vote. Taken in conjunction with closed voting booths, the *AB* made it next to impossible for local powerholders to ascertain the individual votes of their dependents.

Yet the *AB* also made demands on voters that the extant modalities of voting, *viva voce* or, more commonly, the use of candidate and/or party printed ballots, did not make. In particular, it could require basic literacy: the ability to recognize printed names on a ballot or otherwise manipulate the written word to indicate one's political preference. This was especially true in countries with candidate-centric electoral systems, such as open-list proportional representation or SMDs with concurrent elections, which feature large numbers of candidates running for office in any given election cycle. In these cases, the new ballot required scanning through long lists of names often typed in small print, or it might have even demanded that the voter write in the name of his preferred candidate. In such settings, the multi-dimensional nature of voter heterogeneity, taken in conjunction with the ballot accessibility challenges presented by the effective secret vote, lent itself to the formation of constituencies in favor ballot reform that cannot in any reasonable sense be thought of as advocating for the deepening and expansion of democracy.

The best-known example of this occurred in the post-Reconstruction US South, where white supremacists within the Democratic Party advocated for the *AB* based on the expectation that it would create an obstacle to the participation of African Americans (who constituted an important voting block for the Republicans) (Kousser 1974; Perman 2001). As will be discussed below, a similar dynamic was operative in mid-twentieth century Brazil, where the

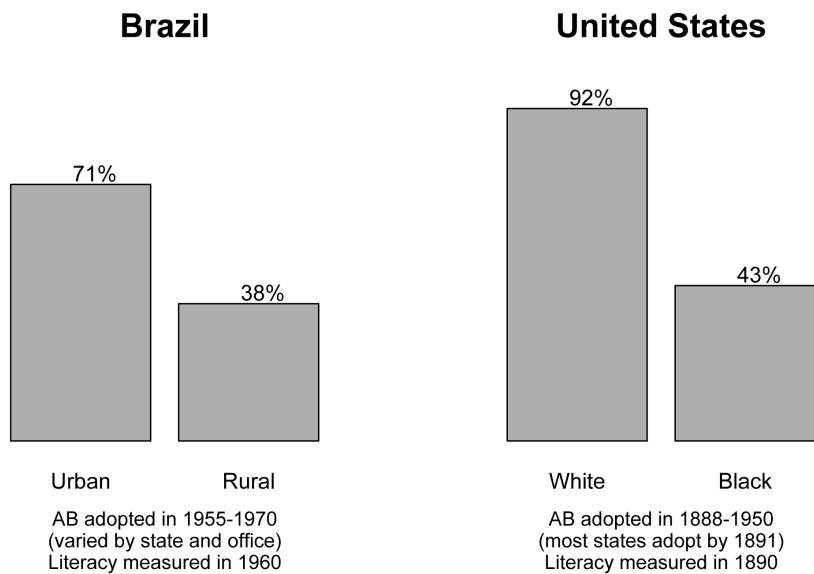
political party most supportive of its adoption, the Democratic National Union (UDN), publicly and enthusiastically embraced the *AB* as a vehicle for purging illiterates from the electorate. Elements within the UDN also helped orchestrate repeated military interventions in politics during this period, activities that ultimately culminated in the 1964 coup that led to over twenty years of military rule (Benevides 1981). Thus, in these countries equating support for the effective secret vote with support for democracy would imply that disenfranchisers and coup mongers somehow represented the vanguard of democratization. Not only were the political forces arrayed in favor of the effective secret vote different from those of suffrage expansion, they were the *exact opposite*.

What made the *AB* a politically attractive tool for narrowing the electorate in these countries was the manner in which literacy overlapped with pre-existing political cleavages. Figure 1 illustrates this point by depicting levels of literacy across politically relevant subgroups of the population at the time of the introduction of the *AB* in Brazil and the United States. The cases are striking in the degree to which literacy covaried with politically relevant geographical and demographic cleavages. In Brazil, the *AB* was instituted at a time in which there was a gaping difference in literacy between urban and rural areas. This was also a time in which industrialization policy systematically pitted the interests of industry and large population centers against those of agriculture and the countryside. In the US, the politically relevant divide fell along racial lines; here differences in literacy levels were even starker. In both cases, the overlap between educational heterogeneity and political preferences made the *AB* a relatively precise and effective instrument of disenfranchisement. Given the accessibility challenges the *AB* presented to illiterates, urban Brazilian modernizers and Southern white supremacists in the US could use this new technology to purge voters aligned against their political interests without running the risk of purging their own followers at the same time.

Proper appreciation of the accessibility dimension of secret ballot reform demands a novel conceptual framework for understanding its implementation. To this end, our article endogenizes the choice for the secret ballot using a model that places diversity in voter education, and, by extension, capacity to access a uniform and official ballot, front and center in the analysis.

As in previous formal analyses of the adoption of the secret ballot, the framework considers how the secret ballot affects the efficacy of clientelist exchange, thereby shaping the preferences of incumbents over this modality of voting (Aidt and Jensen 2017; Heckelman and Yates 2002; cf. Baland and Robinson 2008).¹ Yet by considering educational diversity among the electorate, the model is able to analyze how preferences for more or less effective forms of clientelism may trade off against preferences for a relatively narrow or broad franchise.

Figure 1: Literacy Rates at the Time of the Introduction of the Australian Ballot in Brazil and the United States



Sources on AB adoption date: Gingerich (2018), Heckelman (1995). Sources on literacy: IBGE (1967), National Center for Education Statistics (https://nces.ed.gov/naal/lit_history.asp).

The framework of the paper differs from existing treatments of the adoption of the secret ballot in another important way. Specifically, it models a mechanism by which clientelism may survive under the secret ballot, rather than presuming that clientelism in essence vanishes once it has been adopted. This has the virtue of consistency with a voluminous empirical literature demonstrating the existence and relevance of clientelist exchange in many democracies with a secret vote.² In this regard, the paper builds upon a growing political economy literature on the

1. For models that endogenize the modality of clientelism *given* the level of ballot secrecy, see Morgan and Várdy (2012) and Gans-Morse, Mazzuca, and Nichter (2014).

2. An incomplete list of recent contributions includes Calvo and Murillo (2013), de Kadt and Larreguy (2018), Gingerich (2014), Larreguy, Olea, and Querubín (2017), Oliveros (2016), Mares, Muntean, and Petrova (2018),

use of outcome-contingent contracts as a means of influencing voters in contexts where individual vote choice is entirely secret (Smith and Bueno de Mesquita 2012; Gingerich and Medina 2013; Rueda 2015, 2017). By embedding into our framework an outcome-contingent model of clientelist exchange under the secret ballot, the paper provides a more comprehensive assessment of the opportunity costs to incumbents of abandoning the open vote. As a consequence, it generates comparative statics predictions about the impact of constituency characteristics such as electorate size that are distinct from those in the extant literature.

At an empirical-level, our paper follows the example of Ziblatt (2008), Ardanaz and Mares (2013), and Mares (2015) in evaluating claims about the factors that drive the adoption of vote secrecy through an examination of legislative voting behavior in a specific country (mid-twentieth century Brazil). Such an empirical strategy necessarily privileges concerns about internal validity over those about external validity. There are several reasons why we believe that this emphasis on internal validity is merited.

First, in studies of vote secrecy it can be difficult to classify the institution of interest correctly, since the adoption of vote secrecy is often not a single discrete moment but rather a series of steps typically beginning with the nominal proclamation of secrecy and ending with the supporting legislation and electoral procedures that make the proclamation of secrecy a reality. Decades often pass between these two steps. Moreover, in a number of countries, including Australia, Brazil, Germany, the United States, and Canada, the effective secret ballot was not implemented wholesale for the entire country, but rather adopted at different times for different regions. This makes a purely country-level, cross-sectional analysis difficult to interpret.

A second consideration counseling a more narrow focus is heterogeneity in the contrast space. Simply put, there is no such thing as “the” effective secret ballot, much like there is no single disease that can meaningfully be called cancer. To take the case of the *AB*, the format of the official ballot varies enormously around the world, and, in the US, it also varied widely across states (Albright 1942; Reynolds and Steenbergen 2006). Moreover, the modality of voting prior to the effective secret ballot differed across countries and occasionally across regions within and Stokes et al. (2013).

those countries. Consequently, cross-national analyses based on a simple dichotomization of the presence or absence of the effective secret vote are at risk of averaging across fundamentally heterogeneous contrast spaces for the units in a given sample.

Finally, we believe that a country-specific empirical analysis focusing on the behavior of legislators makes the most sense from a theoretical vantage point, since it is ultimately electoral legislation passed by the parliament that determines whether or not the secret ballot prevails. By studying legislators, one insures that the units of analysis emphasized in one's theory of electoral reform are the same as those used to empirically assess said theory.

III. A MODEL OF VOTE SECRECY WITH EDUCATIONALLY DIVERSE VOTERS

Actors. Consider an electoral jurisdiction in which an incumbent politician (I) and a challenger (C) compete for the votes of a group of N voters, with a representative voter indexed by j . Voters are assumed to be heterogenous in terms of their capacity to read and write (literacy). For simplicity, we treat literacy as a binary trait. Literate voters constitute a fraction $\sigma \in (0, 1)$ of the total electorate.

Electoral Regimes. The election can take place under one of two different electoral regimes: an open voting regime or a secret ballot regime. In the open voting regime, the votes of individual voters can be ascertained directly by the incumbent. This scenario reflects the state of affairs under *viva voce* or voting under ballot-and-envelope systems in which ballots are printed and distributed by candidates or parties. In the secret ballot regime, the electoral choices of individual voters are entirely private. This scenario reflects the state of affairs under the *AB* system. The relevance of the distinction between the two regimes lies with the nature of clientelist exchange that can be organized by the incumbent as well as the scope of the electorate itself. Under open voting, the incumbent can condition the receipt of a material benefit $\theta > 0$ to the specific vote cast by each voter. Under secret voting, the incumbent is limited to an outcome-contingent strategy, meaning that he can only condition the receipt of θ upon the aggregate electoral outcome. Thus, in the open voting regime voters receive θ if and

only if they cast a vote for the incumbent, whereas in the secret ballot regime voters receive θ if and only if I wins the majority of the vote in the electoral jurisdiction.

The electoral regime is also relevant for the accessibility of the ballot. As discussed above, the introduction of the AB may, depending on the underlying institutional context, have a disenfranchising effect for illiterate voters who cannot read or write names on a voting paper. Our model is structured to capture political dynamics in such settings, primarily candidate-centric electoral systems that cannot or do not use party symbols on official ballots. Consequently, one can conceptualize the introduction of vote secrecy as purging from meaningful political participation those voters who are functionally illiterate. Our model represents this by limiting the suffrage under the secret ballot to literate voters.

Actions. We assume a scenario of obligatory voting that engenders full turnout *among those able to vote*. As such, the action taken by a given voter consists solely of her vote $v_j \in \{0, 1\}$, where $v_j = 1$ is a vote for the incumbent and $v_j = 0$ is a vote for the challenger. The action to be taken by the incumbent consists of the choice of the underlying electoral regime that will govern the election. This choice is made at the beginning of the game, prior to votes being cast by voters.

Remarks. Although stark, the assumption of compulsory voting and disenfranchisement of illiterate voters under the secret ballot is a limiting case of two real world scenarios. In the first, voter turnout is non-compulsory but the increase in the cost of voting associated with the adoption of the secret ballot (due to ballot complexity) is much greater for illiterate voters. This is the experience described in several states in the US South. In the second, turnout is compulsory but voters may make errors or omissions in voting which keep their votes from counting. If the increase in the errors engendered by the secret ballot (again, due to ballot complexity) is much greater among illiterates than literates, then disenfranchisement occurs via differential error rates. As discussed later, this was the historical experience of Brazil. Our set up is compatible with either modality of disenfranchisement.

Utility. Voters differ in their intrinsic tastes for the incumbent and challenger, resulting in varying expressive utilities associated with casting a vote for one or the other. In particular, let

x_j represent the expressive utility that j associates with casting a vote for I instead of C . This utility differential may be due to the ideological affinities of a particular voter or to her personal evaluations of the candidates. We permit the distribution of such expressive utilities to differ according to literacy. More specifically, for literate voters the expressive utilities are distributed uniformly with support $[-\mu - 1/2h, -\mu + 1/2h]$, whereas for illiterate voters the utilities are distributed uniformly with support $[\mu - 1/2h, \mu + 1/2h]$. According to this formulation, $\mu \in \mathbb{R}$ parameterizes the (mean) difference between illiterate and literature voters in the degree to which they intrinsically favor the incumbent (ignoring any material inducements brought to bear in the election). An incumbent with a large positive value of μ can count on ideological support primarily from illiterate voters; the opposite is true for an incumbent with a large negative value of μ .³

Given these preliminaries, we can describe the utility a representative voter associates with voting for the incumbent. Under open voting, the utility of voting for the incumbent is:

$$(1) \quad u_j(1) = x_j + \theta.$$

By contrast, under the secret ballot regime the utility of voting for the incumbent is:

$$(2) \quad u_j(1) = x_j + \Delta_j \theta,$$

where Δ_j is the impact that voter j 's vote has on the probability of a victory by I .

We follow the approach of Gingerich and Medina (2013) and express this latter quantity as a function of the expected margin of victory in I 's favor, $M^e \in [-N..N]$. In particular, we express the impact of a vote on the anticipated probability of victory by I using a symmetric

3. Note that the special case of $\mu = 0$ captures the setting in which ballot reform has no relevant implications for the scope of the franchise. In this sense, the current model is a generalization of frameworks that endogenize the choice for the secret ballot based solely on considerations about the returns to clientelism.

triangular density:

$$(3) \quad \Delta_j = \Delta(M^e) = \begin{cases} 0 & \text{if } M^e < -\widetilde{M} \\ (\widetilde{M} + M^e)/\widetilde{M}^2 & \text{if } -\widetilde{M} < M^e \leq 0 \\ (\widetilde{M} - M^e)/\widetilde{M}^2 & \text{if } 0 \leq M^e < \widetilde{M} \\ 0 & \text{if } M^e > \widetilde{M} \end{cases},$$

where \widetilde{M} is the threshold difference in votes above which in absolute value a voter deems her vote to be irrelevant for the election outcome. The specification of the vote impact function reflects the commonsense notion that voters will judge their impact on the election to be greatest in contexts in which the anticipated margin of victory is small and negligible in contexts in which the anticipated margin is large.

The key difference in the expressions for voter utility across electoral regimes rests with the weight voters place on θ . Whereas in an open voting system this weight is unity, in a secret ballot system it is only equal to the voter's marginal contribution to the aggregate outcome. This latter quantity is less than 1 and typically quite small in electoral jurisdictions of moderate or large size. It precisely via this differential in weighting that ballot secrecy reduces the capacity of incumbents to bring material resources to bear in shifting the electoral preferences of voters.

We consider an elementary utility function for the incumbent. Let Ω_O denote the vote share for the incumbent under open voting and Ω_S denote the vote share for the incumbent under secret voting. The incumbent's utility for instituting a secret ballot regime is:

$$(4) \quad u_I = \mathbb{E}[\Omega_S] - \Omega_O,$$

where \mathbb{E} is the expectations operator. (As will become clear in what follows, taking the expectation of the vote share function under the secret ballot regime is necessary due to the prospect of multiple equilibria.) The incumbent is electorally instrumental: he will adopt the electoral regime that provides the highest expected vote share.

Equilibrium Vote Shares. We begin with voting under the open voting regime. In this

setting, any voter for whom $x \geq -\theta$ will vote for I . Consequently, the vote share for I under open voting is equal to:

$$(5) \quad \Omega_O = \frac{1}{2} + h[\theta + \mu(1 - 2\sigma)].$$

Deriving the vote share under secret voting is more complex since the incumbent induces a coordination game among voters through his use of an outcome contingent reward in place of individual targeting. Recall that in this context illiterates have been purged from the electorate so that all voters are literates. Among this group, any voter for whom $x \geq -\Delta\theta$ will vote for I . Thus, the proportion of the vote accruing to I under the secret ballot is written:

$$(6) \quad \Omega_S(M^e) = \frac{1}{2} + h[\Delta(M^e)\theta - \mu].$$

The above proportion is a function of the anticipated margin of victory. To characterize it in equilibrium, one must first calculate an equilibrium margin of victory, M^* . To do so, define the actual margin as:

$$(7) \quad M = T_I(M^e) - T_C(M^e),$$

where T_I is the total number of votes cast for I and T_C is the total number of votes cast for C . Setting the actual and anticipated margins equal to one another ($M^e = M = M^*$) and plugging into the above, an equilibrium margin M^* is a fixed point of the following equation:

$$(8) \quad M^* = N\sigma(2\Omega_S(M^*) - 1).$$

The Appendix provides a derivation of equilibria that satisfy this equation. Depending on parameter values, there may either be only a single equilibrium margin that satisfies the above, or, alternatively, there may be three equilibria that do so. If three equilibria exist, only the highest (M^H) and lowest of these (M^L) are stable. In general, the number of equilibria and

their characterization depends on μ , the intrinsic aversion to I among literate voters.

If μ is such that there are multiple equilibria under the secret ballot, the incumbent cannot know ex ante which of the two stable equilibria will obtain. Thus, he evaluates the attractiveness of the secret ballot regime by calculating his expected vote share under this regime as follows:

$$(9) \quad \mathbb{E}[\Omega_S] = \gamma\Omega_S(M^L) + (1 - \gamma)\Omega_S(M^H),$$

where $\gamma \in [0, 1]$ is a constant that represents the probability of the low margin equilibrium.

One can rewrite the above quantity as:

$$(10) \quad \mathbb{E}[\Omega_S] = \frac{1}{2} + h\theta\mathbb{E}[\Delta(M)] - h\mu$$

$$\text{where } E[\Delta(M)] = \begin{cases} 0 & \text{if } \mu < \mu_1 \text{ or } \mu > \mu_3 \\ \Delta(M^*) & \text{if } \mu_1 < \mu < \mu_2 \\ (1 - \gamma)\Delta(M^H) & \text{if } \mu_2 < \mu < \mu_3 \end{cases}.$$

The expression above illustrates that there are two paths by which features of the political and economic environment may influence the incumbent's vote share. They may do so directly, by affecting the incumbent's support holding constant the perceived closeness of the election. Alternatively, they may do so indirectly, by influencing literate voters' beliefs about their relevance to the election outcome and, by extension, the persuasive power of the material resource controlled by the incumbent.⁴ Note, however, this indirect path is only operative if voter preferences are such that the election is anticipated to be close.

4. The thresholds on μ in (10) are defined in the Appendix. Note that by plugging the expressions for the equilibrium margins into (3), one has $\Delta(M^*) = \Delta(M^H) = \Delta(\theta, \mu, N, \sigma, h, \bar{M})$. In other words, in the two scenarios in which the vote impact function is not zero, it is equal to the exact same function of the fixed parameters of the model.

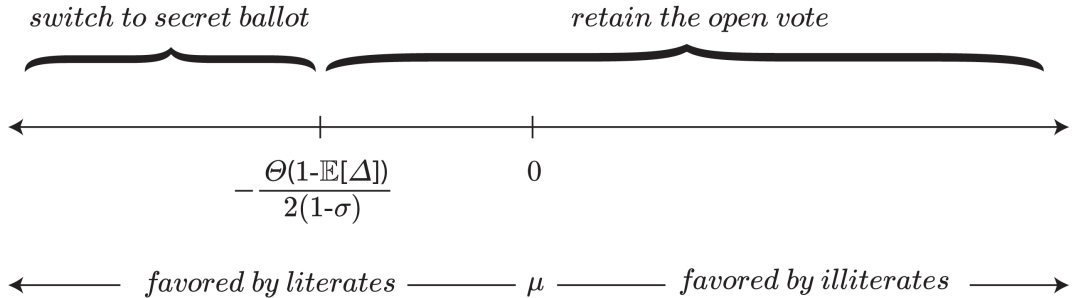
III.A. Choice of Regime

Comparing the expected utilities from the two electoral regimes, the incumbent will choose to implement the secret ballot if and only if

$$(11) \quad \mu < -\frac{\theta(1 - \mathbb{E}[\Delta(M)])}{2(1 - \sigma)}.$$

Using this simple inequality, the central intuitions of the formal model can be gleaned from Figure 2. As shown in the Figure, there is no condition under which an incumbent favored by illiterates ($\mu > 0$) will support the secret ballot. In this case, both of the consequences of the secret ballot—a reduction in the efficacy of clientelism and the reshaping of the electorate—redound to his detriment. If, on the other hand, an incumbent is favored by literates relative to illiterates ($\mu < 0$), he may or may not be inclined to adopt the secret ballot. Ultimately, his choice in this scenario depends on the relative size of the electoral benefit from purging illiterates versus the electoral loss due to weakening the persuasive power of his material inducement, θ . If the proportion of illiterates is large and/or the value of the material inducement is small, then an incumbent favored by literates will choose to adopt the secret vote. However, if the proportion of illiterates is small and/or the value of the material inducement is large, such an incumbent will be inclined to retain the open vote.

Figure 2: Choice of Electoral Regime



Note that the above trade-off is mediated by the value of the expected vote impact function, $\mathbb{E}[\Delta(M)]$. The greater (smaller) the vote impact function, the further to the right (left) is the

threshold for switching to the secret ballot. This reflects the fact that a larger vote impact function reduces the opportunity cost of adopting the secret ballot. In essence, the more persuasive are I 's outcome contingent contracts under the secret ballot, the less the power of his material inducement is diminished in the transition to the new electoral regime.

The vote impact function, in turn, is shaped by the exogenous parameters of the model. The most relevant of these is μ , which at the extensive margin determines whether or not this function is zero. In cases where the impact function is non-zero, a key determinant of its magnitude is the size of the electorate (N). The Appendix shows that the greater the size of the electorate, the smaller the impact function, since a larger electoral jurisdiction reduces the perception of any given voter that she may influence the election outcome. Consequently, the secret ballot should be more appealing to incumbents in small jurisdictions than large ones. This may be somewhat surprising, as clientelism in many developing countries tends to be particularly embedded in rural communities with sparse numbers of voters. Yet it follows directly from consideration of the *opportunity costs of reform*. It is precisely because of clientelism's viability with small electorates under the secret ballot that incumbents with large electorates have the most to lose from the adoption of this electoral regime.

III.B. Empirical Implications

The paper's theoretical framework generates several empirically falsifiable expectations about how the nature of politicians' electoral bases affects preferences towards the secret ballot. The central expectation in this respect is that greater literacy among a politician's followers leads to a more favorable disposition towards the secret ballot:

H1: Holding all other factors constant, politicians whose votes derive from areas of high literacy will be MORE inclined to adopt the secret ballot than politicians whose votes derive from areas of low literacy.

Another finding of the model is that incumbents possessed of profound material influence over voters will be less inclined towards the secret ballot than those whose influence is more

limited. The intensity of such influence may be determined by a variety of factors, some of which are features of the electorate and others of which are features of the politician himself.

One constituency-level determinant of incumbent material influence emphasized in the literature on democratization is the level of inequality in agricultural landholding (Boix 2003; Ziblatt 2008; Ansell and Samuels 2014). For countries with incipient or uneven industrialization, the concentration of land may reflect the existence of rigid social hierarchies and power structures that permit landed elites to inflict harm upon dependents who behave at odds with their wishes. More specifically, it can imply the absence of viable alternative employment prospects for agricultural workers, thereby permitting the landed elites who employ these individuals to direct their votes to politicians of their preference (Baland and Robinson 2008). This leads to our second hypothesis:

H2: Holding all other factors constant, politicians whose votes derive from areas with high inequality in landholding will be LESS inclined to adopt the secret ballot than politicians whose votes derive from areas with low inequality in landholding.

A second constituency-level determinant of incumbent influence is the manner in which voters are inserted into the labor market. The more such insertion affords incumbents or their local representatives discretionary power over employment, the more reticent incumbents will be to adopt the AB. For countries initiating the process of industrialization, such discretionary power is typically positively related to the level of agricultural employment and negatively related to the level of industrial employment. This leads to the following hypothesis:

H3: Holding all other factors constant, politicians whose votes derive from areas where the labor market generates high discretionary power over employment (high agricultural employment, low industrial employment) will be LESS inclined to adopt the secret ballot than those whose votes derive from areas where the labor market generates low discretionary power (low agricultural employment, high industrial employment).

A third constituency-level determinant of incumbent influence emphasized by the model is the size of the electorate. Politicians facing larger electorates should be less disposed to the secret ballot than those facing smaller electorates, all else equal, due to the opportunity cost argument elaborated above. Thus, our hypothesis is:

H4: Holding all other factors constant, politicians whose votes derive from areas with large numbers of registered voters will be LESS inclined towards the secret ballot than politicians whose votes derive from areas with small numbers of registered voters.

In terms of the personal characteristics of politicians, influence can be conceptualized as the sum total of the material and human resources that can be brought to bear at election time. Influence so conceived may be a function of an incumbent's personal wealth, his ability to exploit state resources and personnel for political advantage, and/or the scope of local networks that can be brought to bear in favor of his candidacy. Incumbents who have significant personal campaign resources to rely on, or who can rely on state officials and local intermediaries to cajole or intimidate voters on their behalf, are likely to find the adoption of the secret ballot to be an unattractive proposition (Kasara and Mares 2017). This leads to the following hypothesis:

H5: Holding all other factors constant, politicians with greater personal and local network resources will be LESS inclined to adopt the secret ballot than politicians with smaller amounts of such resources.

IV. HISTORICAL BACKGROUND

Whereas most of Europe and the majority of states in the US adopted some variant of the AB by the beginning of the twentieth century, this was not true for Latin America. A more typical pattern in the region was the promulgation of nominal vote secrecy in constitutions during the early decades of the century followed by the transition to the AB at mid-century or shortly thereafter. This was the basic trajectory of electoral reform in countries such as

Brazil, Chile, and Peru.⁵ During the period prior to the adoption of the AB, voting was conducted through the use of the ballot-and-envelope system originally developed in France. Under this system, there were distinct ballots for each candidate or party. In theory, the system was supposed to provide vote secrecy by having voters receive official envelopes from electoral authorities then retire to a private compartment, at which time they would place their ballots into the envelopes. In practice, however, votes were easily monitored and controlled. Ballots were printed by candidates or parties at their own expense, and they were distributed to voters by campaign workers or local landholders. Local elites would often shepherd voters to the polls to make sure they did not receive ballots from competitors. Writing on the basis of personal observation, Orlando M. de Carvalho described this process in Minas Gerais, Brazil:

Each landowner adopted a system of bringing to their own residence a group of voters-peasants. There, they were divided into small groups of 3 or 4, their electoral titles and voting section information ascertained. Afterwards, they were driven in trusted automobiles to locations close to the precincts and delivered to friendly ward heelers (*cabos eleitorais*) stationed next to the polling stations. Subsequently, they were handed over to a group of women who strategically positioned them and watched over them until it was time to vote (de Carvalho 1954, p.231).

Given the frequency of these practices in rural Brazil, it was widely appreciated that transitioning from the ballot-and-envelope system to the AB would represent a major step in putting into practice the principle of a secret vote.

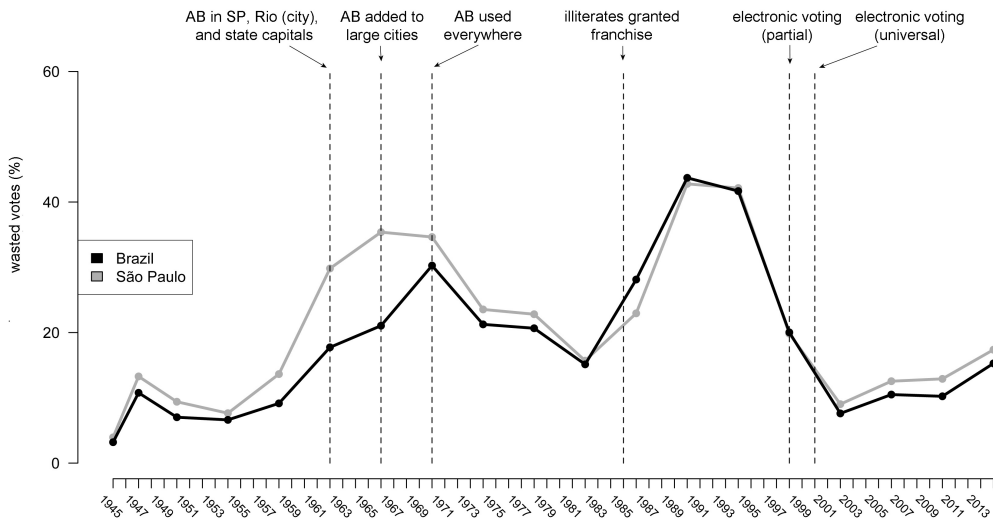
Yet the transition was politically relevant for another reason: it held the potential to disenfranchise voters with low levels of literacy. This was a particularly pertinent issue for Brazil, which adopted the AB in a staggered fashion over the course of fifteen years (1955-1970). During this period, approximately forty percent of the adult population could not read and write according to the census criteria (IBGE 1967), with actual levels of functional illiteracy almost certainly much higher. Although the constitution of the time formally prohibited illiterates

5. Other countries made the transition even later, such as Colombia in 1991. Argentina is a notable outlier in that to this day it has still not adopted the full AB for national elections.

from registering to vote, the lack of any meaningful check for literacy during the registration process led to large masses of illiterate voters registering under the tutelage of local political bosses (Limongi 2015).⁶

In point of fact, the AB did disenfranchise illiterate voters. In a detailed municipal-level analysis of voting returns from the period, Gingerich (2018) shows that the introduction of the AB in federal deputy elections led to a vertiginous increase in wasted votes, particularly in areas of high illiteracy. The complexity of voting with the AB helps explain this outcome. For offices contested via proportional representation (federal deputy, state deputy, municipal councilor), the official ballot required voters to write in the name of their preferred candidate or a number that represented the candidate. This made the AB especially unfriendly to voters with low levels of education.

Figure 3: Wasted Votes in Federal Deputy Elections, 1945-2014



Source: Supreme Electoral Tribunal (TSE).

The legacy of the AB can be discerned in Figure 3, which displays wasted votes as a percentage of all votes cast in the country as a whole as well as in the state of São Paulo. In the initial years of the Second Republic, vote wastage was fairly low. With the introduction of

6. Hidalgo and Nichter (2016) shows that the phenomenon of voter registration by local bosses continues to the present day, especially in smaller municipalities.

the AB for federal deputy elections in São Paulo, the city of Rio de Janeiro, and state capitals in 1962, the level of wastage rose exponentially, reaching a high point in the legislative election 1970 (the first in which the AB was in place throughout the entire country).⁷ Subsequently, wastage declined for three election cycles, although without reverting to the pre-reform level. With the passage of a constitutional amendment in 1985 formally giving illiterates the right to vote, wastage shot back up again, reaching its highest point in the series. It is not until the universal adoption of electronic voting in 2000 that the level of vote wastage approximated that before the introduction of the AB.⁸ All told, under the operation of the *cédula oficial* nearly one in three Brazilian voters cast votes that were irrelevant in determining the composition of the ruling elite.

It is against this historical backdrop that we study the votes of Brazil’s legislators over the AB. We examine four different roll call votes on the AB that took place in the Chamber of Deputies from 1955 to 1962. To the best of our knowledge, these are all the recorded roll call votes on the AB in Brazil. All votes were recorded in *Diário do Congresso Nacional I* on the dates indicated below. Descriptions of these roll calls are provided in the Appendix.

In our statistical analyses of the roll calls, we focus on the choices of legislators who were free to vote according to their preferences. Such freedom was by no means guaranteed. Particularly in the 1955 roll call, and to a lesser degree in the subsequent roll calls, certain party leaders decided that voting on the AB for their parties was to be a “closed question.” This meant that all rank-and-file members of these parties were required to vote the same way on a given roll call. Eliminating the votes of legislators belonging to such parties is crucial for valid inference since the characteristics of a legislator’s background and constituency cannot possibly drive vote choice when voting behavior is determined *ex ante* by party leaders. Given that party leaders’ decisions to make votes open or closed are not available for all parties in the

7. Note the relative trajectories of São Paulo versus Brazil as a whole. Vote wastage in São Paulo grows more quickly and exceeds that in the country as a whole during the legislative cycles in which São Paulo in its entirety used the AB but other states did not (1962, 1966). In other periods, wastage in the state and the country were more or less equivalent in level and rate of change.

8. See Fujiwara (2015) and Hidalgo (2014) for evidence linking electronic voting to a decline in wasted votes. However, Zucco and Nicolau (2016) suggest that part of the decline may be attributable to another voting error, namely, votes cast mistakenly for a party label instead of a candidate.

parliamentary records of this period, we proceed by removing from the analysis the votes of legislators belonging to a party that cast a strict party line vote on a given roll call. However, in what follows we also present the party-level voting trends and discuss how these correspond to the intuitions of our theoretical framework.

V. MEASUREMENT

Explanatory Variables. In order to evaluate the impact of personal and constituency-level factors on voting behavior on the AB, we combine the roll call voting data with information from four sources: the demographic census of 1960, the agrarian census of the same year, candidate-specific electoral returns available at the municipal-level for Chamber of Deputies elections in 1954 and 1958, and detailed biographical information contained in the *Historical Biographical Dictionary of Brazil* (Dicionário Histórico-Biográfico Brasileiro, DHBB).

The electoral returns are utilized to characterize a legislator’s electoral support base. Although federal deputies in Brazil represent entire states, most deputies during this period received their votes in a small number of contiguous municipalities. Thus, in order to provide a socio-demographic profile of a deputy’s support base, we use information about the location of the votes he received in the most recent election in conjunction with information about municipal-level characteristics described in the censuses. In particular, we characterize a deputy’s vote base by taking a weighted average of the features of the municipalities where he received votes, where the weight assigned to a given municipality is equal to the share of the deputy’s vote that it represents. Formally, let k denote a generic federal deputy, $l \in \{1, \dots, L\}$ denote a generic municipality contained within the state the deputy represents, and ω_{kl} denote deputy k ’s vote share in municipality l . For any constituency-level feature z , the value of that feature for deputy k is equal to:

$$(12) \quad z_k = \sum_l^L \omega_{kl} z_l.$$

Electoral returns for this period were acquired from the archives of state-level electoral

tribunals. For the 1954 elections, returns containing votes for each candidate by municipality were available for the states of Acre, Bahia, Espirito Santo, the Federal District (contemporary city of Rio de Janeiro), Mato Grosso, Paraíba, Paraná, Pernambuco, Rio Grande do Sul, and São Paulo. For the 1958 elections, returns were available for these same states (except for Espirito Santo) plus Minas Gerais, Piauí, Rio de Janeiro (state), and Sergipe. The returns for the 1954 elections were used to characterize sitting deputies' support bases for the roll calls taking place in 1958, whereas the electoral returns from 1958 are used to characterize sitting deputies' support bases for the 1962 vote. In total, we are able to characterize the support bases of 144 out of 256 deputies in June 1958, 152 out of 285 deputies in November 1958, and 187 out of 260 deputies in 1962.⁹

We measure five aspects of a deputy's support base. The first is its rate of literacy, provided in the demographic census. The second is the level of inequality in agricultural landholding. This was measured by calculating the gini coefficient for such landholdings for each municipality, a statistic that can be calculated with substantial precision given that the agricultural census breaks down the number and area of landholdings according to fifteen different size thresholds. The third and fourth aspects of a deputy's support base that we measure are the percentages of the working age population employed in agriculture and industry, respectively. The final aspect of a deputy's support base we measure is its size: the average number of registered voters it contains. This information is provided directly in the electoral returns.

We utilize information about deputies' occupational histories contained in the DHBB in order to tap into their ability to exploit personal and local network resources for electoral gain. In particular, we measure whether or not a deputy had served as a mayor, governor, cabinet minister, federal agency head, or state secretary prior to being seated in the legislature. The first variable, having formerly served as a mayor, is an indicator of the strength of a politician's local ties and influence. Through kinship and friendship networks, former mayors may retain influence over the municipal machines that they once commanded (cf. do Rêgo 2008).¹⁰ This

9. The total number of deputies recorded for a given vote were those who cast yea votes, nay votes, or were listed as absent. The Appendix provides a detailed discussion of the procedures used to merge the information from the censuses and electoral returns in order to measure the characteristics of deputies' support bases.

10. Indeed, many deputies move back to municipal office after they have served in the Chamber (Samuels

represents an instrument of substantial political power: studies have shown that mayors and municipal machines can have a significant impact on electoral returns (cf. Avelino, Biderman, and Barone 2012; Novaes 2018).

The other occupational categories proxy for the size of a deputy’s campaign war chest and the capacity to target state resources to one’s electoral base. Stints in high-ranking positions in the federal and state bureaucracy offer ample opportunities for graft and other rent-seeking activities that can play an important role in financing political campaigns (Gingerich 2013). They may also permit deputies to draw on personal contacts in order to liberate public projects in their support bases that are frozen by bureaucratic red tape. Given governors’ critical role in Brazil’s federal system and the discretionary control over public resources they enjoyed at the state-level, these actors were especially notorious for amassing large campaign war chests.¹¹

Outcome. Our outcome variable is the legislator’s vote on a given roll call, which can be “yea”, “nay” or “absent.” Given the intense partisan conflict during these roll calls, we recognize the possibility of strategic absenteeism. Consequently, we treat an absence as an intermediate category, representing a position on the AB that is neither sufficiently favorable to generate a public yea nor sufficiently unfavorable to generate a public nay. In essence, a recorded absence is treated as abstention.¹² In the interest of robustness, the Appendix also reports our findings when recorded absences are removed from the data and only yea and nay votes are analyzed. This approach produces results similar to those presented in the main text.

VI. VOTING ON THE OFFICIAL BALLOT IN BRAZIL

Trends by Party. We begin with an overview of the roll call votes, aggregated by political party. As shown in Table 1, the first roll call on the AB was essentially a party line affair. Among

2001).

11. Tables A1-A4 and Figures A2-A4 in the Appendix provide descriptive statistics and correlation matrices for the constituency- and individual-level variables utilized in our analysis. They are presented both in the original municipal-level format as well as in the legislator specific format that is the basis of our empirics.

12. Lending credence to this approach, abstentions during this period were not a separate category on roll call votes. That is to say, if a legislator wanted to avoid having a recorded yea or nay on a vote, he would have to leave the floor or not show up on the day of the vote.

Brazil's main parties, nearly all legislators present voted with the majority of the members of their party. The breakdown of that vote, and early parliamentary discussions of the AB more generally, were driven largely by a rivalry between Brazil's two largest parties of the time: the Social Democratic Party (PSD) and the National Civic Union (UDN). As can be seen in the Table, the UDN deputies present for the vote aligned uniformly in favor of the AB, whereas the PSD deputies aligned overwhelmingly against it.

The conflict between the PSD and UDN owes to their origins and differences in the ability to exploit clientelist networks in rural areas. Created during the dictatorship of Getúlio Vargas (1937-1945), the PSD was a conservative party whose founding members consisted of Vargas' state-level interveners and their municipal appointees. This fact had two consequences. First, it produced a decentralized organizational structure that tethered national leaders to state and local interests. Second, it laid the foundation for a comprehensive network of municipal directorates, populated by rural vote brokers called *coronéis*, that could be called upon to bring out the vote at election time. Among other activities, *coronéis* and the local PSD directorates they often headed were critically important in the distribution of candidate printed ballots to voters. Given these realities on the ground, no other organization drew greater political sustenance from clientelist networks in the countryside and no other organization was systematically more opposed to the introduction of the official ballot.

Also a conservative organization, the UDN was founded by elite professionals who opposed the Vargas regime. Unlike the PSD, which was overwhelming rural, the UDN contained both urban and rural wings. Moreover, it was the urban wing—consisting of middle class professionals from the city of Rio de Janeiro—that commanded the greatest influence on the leadership and platform of the party. Although the rural wing of the UDN cultivated its own set of *coronéis*, it did so at a disadvantage given the greater organizational strength of the PSD in the countryside. Thus, given the party's social base and its organizational handicaps, the UDN leadership perceived the party as losing out from the continued operation of rural vote brokerage. Consequently, the UDN elites joined forces with high ranking legal actors in Brazil's electoral justice system in order to break the dominance of rural elites in Brazilian electoral

politics. They did this not by targeting the rural elites or their property directly, but rather by drafting electoral legislation—the official ballot reform—that attempted to purge the illiterate voters who constituted the basis of the rural elites’ power.

The disenfranchising intent undergirding the UDN’s stance on the AB is well represented in the parliamentary debates of the time. For instance, Carlos Lacerda, UDN deputy from the Federal District, lauded the *AB*’s narrowing of the franchise on the grounds that “although it is clear that it is in the interest of democracy to have voters, those voters should be conscious, capable, and not voters whose incompetent and uninformed opinion will destroy the collective patrimony (*acêrvo*) of the electorate that is already conscious, politicized, and capable of assuming the responsibility of choosing its leaders” (speech to the Chamber of Deputies, May 26, 1955; printed in *Boletim Eleitoral*, June 1955, pp.542). Fernandes Távorá, UDN senator from Ceará, stated bluntly that if a voter could not utilize the AB, “then he is an illiterate and should be purged” (*Diário do Congresso Nacional* II, August 2, 1955, p.1846).

The opposition of the PSD to the AB was no less intense, and it was also strongly motivated by concerns about the scope of the suffrage. Ulysses Guimarães, one of the founders of the PSD and federal deputy from the state of São Paulo, inveighed against the *AB* based on the argument that the new ballot, by complicating the mechanics of voting, would operate in effect as a form of suffrage restriction for uneducated voters. In making his case, Guimarães explicitly compared the anticipated effects of the *AB* in Brazil to the operation of Jim Crow in the American South (*Diário do Congresso Nacional* I, August 18, 1955, p.5060). Comparable language was later utilized by José Martins Rodrigues, a PSD leader from Ceará, who characterized the AB as an attempt to wrest the vote away from the “uneducated man of the interior”:

The adoption of the [*AB*] poorly disguises or conceals the objective of *selecting the electorate not at the moment of granting the right to exercise the vote, but rather at the exact instant of exercising it*. In this respect, it is an anti-democratic measure, resulting in the devious limitation of the universality of the suffrage, which the Constitution established (*Diário do Congresso Nacional* I, July 5, 1958, p.4199, emphasis mine).

Initially, parties of the Left, such as the Brazilian Labor Party (PTB), were opposed to the AB since they recognized it as a gambit to disenfranchise poor voters. For instance, Aarão Steinbruck, PTB federal deputy from Rio de Janeiro proclaimed that “the [AB]... will have as its sole objective the elimination of a considerable segment of the electorate from the polls, leaving the vote restricted to an electorate of the elite, an oligarchy of the elite” (speech to the Chamber of Deputies, June 23, 1955; printed in *Boletim Eleitoral*, July 1955, pp.623). However, following the introduction of the AB for majoritarian elections it became evident that it was the illiterate clients of Right parties in the countryside, not the generally literate urban workers that traditionally supported the Left, who were being disenfranchised by this instrument. Consequently, the Left warmed to the further expansion of the AB as the roll calls proceeded. After the first roll call, the majority of the PTB shifted in favor of the AB, while by the final roll call some of the smaller parties of the Left, including the Renovating Workers’ Movement (MTR; an offshoot of the PTB) and the Brazilian Socialist Party (PSB), began casting party line votes *in favor* of it. At the same time, given the opening of the ballot question by party leaders, the large conservative parties started exhibiting internal splits on this issue.

These changes were also reflected in the parliamentary debates. Within the Left, the embrace of the AB was exemplified by the speeches of Mário Palmério (PTB-Minas Gerais), who framed his support for the AB as a defense of the interests of the educated electorate relative to the politically unconscious voters of the hinterland (*Anais da Camara dos Deputados*, July 2, 1962, p.450-451). Within the Right, one finds PSD deputies from relatively literate states, such as Lincoln Feliciano da Silva of São Paulo, breaking ranks with the previous position of the party and publicly advocating for the AB as a means of enforcing the constitutional prohibition against the political participation of illiterates (*Diário do Congresso Nacional I*, July 4, 1958, p.4139). The opposite occurred within the UDN, where one encounters legislators from low literacy states, such as Senator João Villasbôas from Mato Grosso, making the case against the AB due to its incompatibility with the educational attainment of the electorate (*Diário do Congresso Nacional II*, June 7, 1962, p.986).

Table 1: Roll Call Votes on the AB in Brazil, 1955-1962 (By Party)

	June 28, 1955				June 21, 1958				November 8, 1958				June 28, 1962				Total
	Yea	Nay	Abs	Total	Yea	Nay	Abs	Total	Yea	Nay	Abs	Total	Yea	Nay	Abs	Total	
PSD	6	79	26	111	29	18	41	88	38	21	37	96	51	40	5	96	391
UDN	42	0	26	68	25	12	25	62	48	0	27	75	46	10	5	61	266
PTB	4	33	16	53	16	3	26	45	29	8	14	51	26	14	2	42	191
PSP	17	0	15	32	8	1	14	23	13	4	8	25	11	8	0	19	99
PR	3	3	13	19	5	2	5	12	4	4	4	12	6	4	0	10	53
PL	6	0	1	7	5	1	4	10	7	0	4	11	2	0	1	3	31
PTN	2	1	2	5	4	0	3	7	5	1	2	8	2	2	0	4	24
PSB	1	0	2	3	0	0	1	1	1	0	2	3	8	0	0	8	15
PDC	2	0	0	2	1	0	1	2	1	0	1	2	5	1	0	6	12
PRP	3	0	0	3	0	2	2	4	0	0	1	1	0	3	0	3	11
MTR	-	-	-	-	-	-	-	-	-	-	-	-	5	0	0	5	5
PRT	0	1	0	1	1	0	0	1	1	0	0	1	0	1	0	1	4
PST	0	0	1	1	-	-	-	-	-	-	-	-	0	1	0	1	2
S/PART	-	-	-	-	1	0	0	1	-	-	-	-	1	0	0	1	2
Total	86	117	102	305	95	39	122	256	147	38	100	285	163	84	13	260	1106

Note: A dash indicates a party without legislative representation during a given roll call.

Individual Vote Choice. Although the stances of Brazil’s major parties are consistent with our framework’s emphasis on the role of the AB in shaping the electorate, evaluating our theory in a rigorous manner requires an analysis of individual vote choice. Table 2 presents an ordered logistic regression analysis of the personal and constituency-level determinants of legislators’ votes on the AB.¹³ We focus on the final three roll calls, since these were votes for which most legislators were free to vote according to their individual preferences. We present analyses that pool the votes across the roll calls as well as analyses that examine the 1962 roll call in isolation. This final vote is particularly informative about the determinants of legislators’ preferences, since in analyzing it we are able to bring to bear information about the constituency-level characteristics of legislators in Minas Gerais, among Brazil’s largest states and one whose legislators featured prominently in debates on the adoption of the AB.¹⁴

Some clear patterns are evident in the Table. Consistent with H1, literacy level of a legislator’s support base is a strong determinant of voting behavior on the AB. As expected, the more literate a legislator’s support base, the more inclined he was to vote for the AB (and vice-versa). This was true when literacy was examined in a reduced form estimation including previous tenure as a mayor as the only other substantive predictor, as well as in a broad estimation including all personal and constituency-level characteristics. Thus, even when one controls for structural determinants of landed elite power such as landholding inequality and the proportion of the working age population employed in agriculture and industry, the literacy of a legislator’s voters retains an important influence on legislative voting patterns. Indeed, the influence of literacy is greater than that of any other constituency-level variable. These findings support the notion that legislators’ preferences on the AB were driven by expectations about the prospect of disenfranchisement for illiterate voters.

13. In the Table, all constituency-level variables have been normed to have mean 0 and standard deviation 1 so as to facilitate interpretation.

14. All regressions in the Table include dummy variables for political party. Moreover, the pooled regressions include dummy variables for each legislative vote. Standard errors are clustered by state.

Table 2: Personal and constituency-level determinants of roll call votes on the AB, 1958-1962
(non-party line votes) - Ordered logistic regression

	pooled roll calls		1962 only	
literacy	0.55*** (0.17)	0.47** (0.24)	0.78*** (0.28)	1.18** (0.49)
landholding gini	-	-0.32** (0.13)	-	-0.62** (0.25)
agriculture	-	-0.00 (0.21)	-	0.20 (0.48)
land \times agriculture	-	0.13 (0.16)	-	0.20 (0.29)
industry	-	-0.24 (0.15)	-	-0.63 (0.38)
electorate	-	0.42* (0.23)	-	0.42 (0.35)
Mayor	-0.48** (0.20)	-0.42** (0.19)	-1.09*** (0.36)	-1.28*** (0.36)
Governor	-	0.29 (1.10)	-	0.12 (0.95)
Minister	-	-0.02 (.41)	-	-0.44 (0.51)
Agency head	-	-0.12 (0.34)	-	0.00 (0.63)
State secretary	-	0.22 (0.27)	-	0.80 (0.34)
cutpoint.1	-2.88* (1.62)	-3.17* (1.67)	-1.91 (1.23)	-2.65** (1.19)
cutpoint.2	-1.42 (1.45)	-1.65 (1.48)	-1.66 (1.30)	-2.36* (1.28)
AIC	795.2	784.3	252.0	252.7
N	399	394	167	165
Include party dummies?	Y	Y	Y	Y
Include roll call dummies?	Y	Y	N	N

Note: Cluster robust standard errors in parentheses (clustering on state); *** 99% level, ** 95% level, and * 90% level (two-sided tests). All constituency variables were normed to have a mean of 0 and a standard deviation of 1.

Besides literacy, landholding inequality is the only constituency-level predictor that exerts a statistically significant effect on legislative votes. Consistent with H2, the greater the landholding inequality in a legislator's electoral support base, the less inclined he was to vote for the AB (and vice-versa). In this respect, our results for the Brazilian case are in keeping with

earlier findings on land tenure patterns and legislative voting on the secret ballot in Imperial Germany (Ziblatt 2008; Ardanaz and Mares 2013; Mares 2015). Following discussions in Ansell and Samuels (2014) and Mares (2015), we also included in our estimations an interactive term between landholding inequality and the size of the agricultural workforce.¹⁵ This term was not significant.

Contrary to H4, the size of the electorate in the areas where a deputy received votes was generally not a significant driver of legislative votes. To the degree it had any effect, its sign was opposite to that expected by our theory. This result may be due to two factors. First, the expectation that electorate size matters for preferences over the AB only holds for legislators representing competitive constituencies where there could be a reasonable belief that elections will be close enough for the participation of an individual voter to affect the outcome. In the data, there are likely few legislators satisfying the scope condition for this particular hypothesis. Second, it may be that legislators simply did not foresee how resilient vote brokerage would prove to be in the countryside in spite of the introduction of the AB. Since legislators with vote bases in sparsely populated areas relied more heavily on clientelism before reform than those with bases in more populated areas, they may have simply assumed they had the most to lose from the AB (and, indeed, if their supporters were illiterate, then this assumption would have been correct).

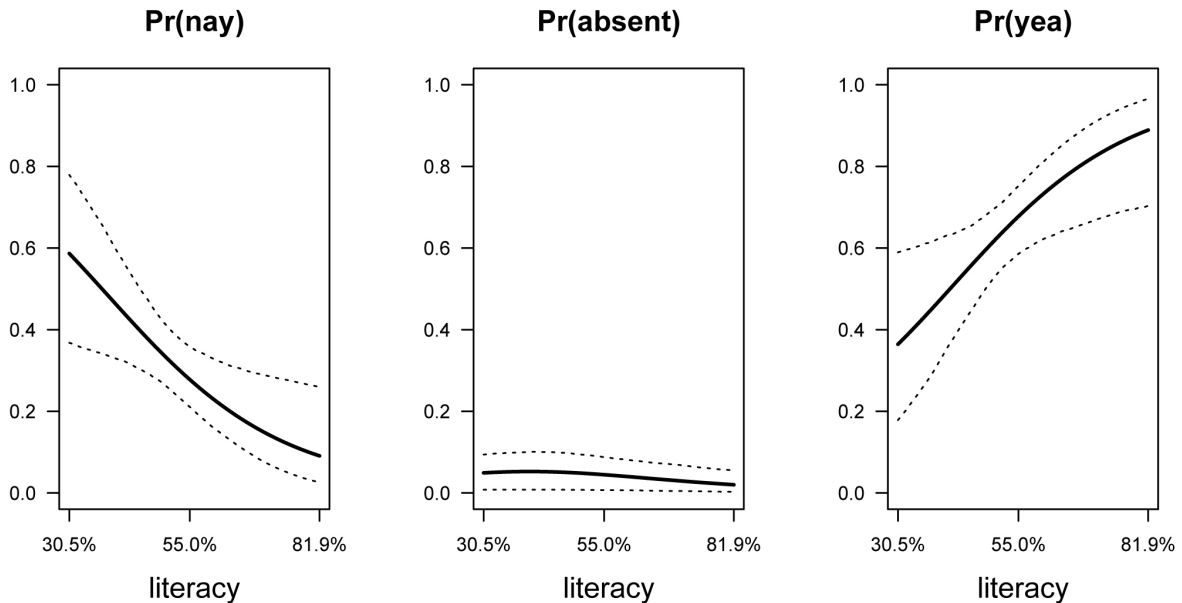
With respect to the personal characteristics of legislators, only one such characteristic systematically drove vote choice on the AB: having previously served as a mayor. As expected by H5, former mayors were significantly less inclined to vote for the AB than non-former mayors. This result helps underline the importance of local ties and network connections for preferences over democratic institutional design. The occupational categories most closely associated with the ability to raise money—serving as a former governor, federal agency head, or state secretary—had no discernable impact on preferences over the AB. The difference in the influence of these two aspects of a legislator’s background suggests that the good graces of local brokers and

15. The justification for this specification is that landholding inequality may be most relevant in contexts in which a large segment of the workforce is employed in agriculture.

municipal machines could not simply be bought by wealthy but otherwise unknown political actors. Although cementing exchanges with local bosses often did involve financial benefits for these individuals, the findings indicate that the market for a boss's services was likely limited to politicians with some previous linkage to the boss's territory.

We performed several simulations in order to gauge the precise impact of the level of literacy in a deputy's support base and having served as a mayor, respectively, on votes for the AB. In the simulations, we calculated the average predicted probabilities for each legislative voting outcome as the variable of interest was varied. In both cases, the fitted models for the 1962 roll call were utilized.

Figure 4: Average predicted probabilities of roll call voting outcomes on the AB, 1962 (by literacy)



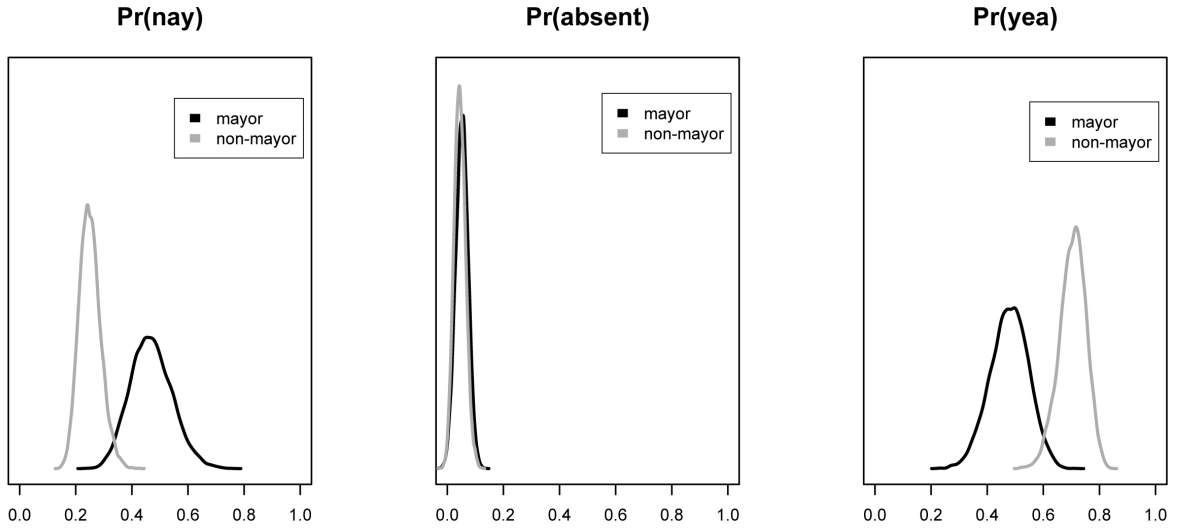
Note: Thick solid lines depict average predicted probabilities; dashed lines depict 95% confidence intervals.

Figure 4 displays the average predictive probabilities as the level of literacy increases from the value of the 5th-percentile in the sample (30.5%) to the 95th percentile (81.9%). This change in literacy reduces the average probability of casting a nay vote from 0.59 to 0.09. At the same time, the change increases the average probability of casting a yea vote from 0.36 to 0.89. (The corresponding change in absenteeism is relatively small). This indicates a major substantive effect of literacy. Indeed, differing levels of constituent literacy could have produced

a strong majority vote against the AB or an overwhelming supermajority in favor of it.

Figure 5 presents the average predictive probabilities corresponding to being a former mayor versus a non-former mayor, respectively. Assigning all legislators to the status of former mayor results in an average predicted probability of casting a nay vote of 0.47 and an average predicted probability of casting a yea vote of 0.48. In contrast, assigning all legislators to the status of non-former mayor results in an average predicted probability of casting a nay vote of 0.25 and an average predicted probability of casting a yea vote of 0.70. Again, this is a substantively large effect, sufficient to shift the balance of the vote from a near 50-50 split on the AB to a strong majority in favor of it.

Figure 5: Average predicted probabilities of roll call voting outcomes on the AB, 1962 (by previous office)



Note: Displayed are the densities of the average predicted probability of each roll call voting outcome for former mayor and non-former mayors.

VII. CONCLUSION

This article offers a novel conceptual framework for understanding the incentives to adopt the effective secret ballot. The central insight of the framework is that in certain contexts—

educationally diverse societies with an overlap between political cleavages and literacy—the transition to the effective secret ballot simultaneously represented an opportunity to reduce the electoral returns to clientelism and to reshape the electorate. Accordingly, the preferences of politicians over the secret ballot in these settings should be governed by calculations of electoral advantage that take into account both of these consequences of the new voting technology.

Evidence from the Brazilian experience with the adoption of the AB is broadly consistent with the assumptions and implications of our framework. In keeping with our assumption that the effective secret ballot may be used to shape the electorate, partisan stances on the AB and the public statements of legislators about this innovation—both for and against—were predicated on the expectation that functional illiterates would be effectively purged should the AB be adopted. Moreover, in testing the implications of our framework, we find that both considerations of the accessibility of the ballot and its consequences for the efficacy of clientelist networks played a role in legislative voting on the AB. In particular, the level of literacy of a legislator’s supporters strongly influenced legislative vote choice, as did an aspect of a legislator’s occupational history—having served as a mayor—that is indicative of the capacity to activate local clientelist networks in one’s favor.

The theory and empirics we bring to bear in this paper cast into sharp relief an important fact about democratization. Distinct institutional components of democracy may at times work at cross-purposes with one another. Reforms ostensibly designed to reinforce the autonomy of voters may in fact restrict the franchise, while reforms aiming to broaden the franchise may potentially extend the scope of coercion. Consequently, theories of democratization based on strategic calculi about suffrage extension may be of limited applicability in explaining the political dynamics undergirding the adoption of institutions thought to be critical to the operation of the franchise, such as an effective secret ballot. Given that several of the most influential theories of democratization envision democracy as coming into being at the moment when ruling elites decide to concede the franchise, the fact that the political logic of franchise extension does not carry over to other reforms means that much work remains to be done in achieving an understanding of how modern forms of democratic representation are actually produced.

REFERENCES

- Acemoglu, D., and J.A. Robinson. (2006). *Economic Origins of Dictatorship and Democracy*. Cambridge; New York: Cambridge University Press.
- Aghion, P., A. Alesina, and F. Trebbi. (2004). “Endogenous Political Institutions.” *Quarterly Journal of Economics* 119(2): 565–611.
- Aidt, T.S., and P.S. Jensen. (2017). “From Open to Secret Ballot: Vote Buying and Modernization.” *Comparative Political Studies* 50(5): 555–93.
- Albright, S.D.. (1942). *The American Ballot*. American Council on Public Affairs.
- Ansell, B.W., and D. Samuels. (2014). *Inequality and Democratization: An Elite-Competition Approach*. New York, NY: Cambridge University Press.
- Ardanaz, M., and I. Mares. (2014). “Labor Shortages, Rural Inequality, and Democratization.” *Comparative Political Studies* 47(12): 1639–69.
- Avelino, G., C. Biderman, and L.S. Barone. (2012). “Articulações Intrapartidárias e Desempenho Eleitoral no Brasil.” *Dados* 55 (4).
- Baland, J-M, and J.A. Robinson. (2008). “Land and Power: Theory and Evidence from Chile.” *American Economic Review* 98(5): 1737–65.
- Benevides, MV. (1981). *A UDN e o udenismo: ambigüidades do liberalismo brasileiro, 1945-1965*. São Paulo: Paz e Terra.
- Boix, C. (1999). “Setting the Rules of the Game: The Choice of Electoral Systems in Advanced Democracies.” *American Political Science Review* 93(3): 609–24.
- . 2003. *Democracy and Redistribution*. Cambridge; New York: Cambridge University Press.
- Calvo, E. (2009). “The Competitive Road to Proportional Representation: Partisan Biases and Electoral Regime Change under Increasing Party Competition.” *World Politics* 61(2): 254–95.
- , and M.V. Murillo. (2013). “When parties meet voters: Assessing political linkages through partisan networks and distributive expectations in Argentina and Chile.” *Comparative Political Studies* 46 (7): 851-882.
- de Carvalho, O.M. (1954). “O Eleitorado do Interior.” Printed in *Boletim Eleitoral*, December 1954: 229-231.

- Cusack, T., T. Iversen, and D. Soskice. (2007). "Economic Interests and the Origins of Electoral Systems." *American Political Science Review* 101(3): 373–391.
- Diermeier, D, and K. Krehbiel. (2003). "Institutionalism as a Methodology." *Journal of Theoretical Politics* 15(2): 123–44.
- Elklit, J. (1983). "Mobilization and Partisan Division: Open Voting in Fredericia, Denmark." *Social Science History* 7(3): 235–66.
- Fujiwara, T. (2015). Voting technology, political responsiveness, and infant health: Evidence from Brazil. *Econometrica* 83(2), 423-464.
- Gans-Morse, J., S. Mazzuca, and S. Nichter. (2014). "Varieties of clientelism: Machine politics during elections." *American Journal of Political Science* 58 (2): 415-432.
- Gingerich, D.W. (2013). *Political Institutions and Party-Directed Corruption in South America: Stealing for the Team*. New York, NY, USA: Cambridge University Press.
- . (2014). "Brokered Politics in Brazil: An Empirical Analysis." *Quarterly Journal of Political Science* 9(3): 269–300.
- . (2018). Ballot Reform as Suffrage Restriction: Evidence from Brazil's Second Republic. Working paper, University of Virginia.
- , and L.F. Medina. (2013). "The Endurance and Eclipse of the Controlled Vote: A Formal Model of Vote Brokerage Under the Secret Ballot." *Economics & Politics* 25(3): 453–80.
- Heckelman, J.C., (1995). "The effect of the secret ballot on voter turnout rates." *Public Choice* 82 (1/2), 107-124.
- , and A.J. Yates. (2002). "Incumbency Preservation through Electoral Legislation: The Case of the Secret Ballot." *Economics of Governance* 3(1): 47–57.
- Hidalgo, F.D. 2014. Digital Democracy: The Consequences of Electronic Voting Technology in Brazil. Working paper, MIT.
- , and S. Nichter. (2016). "Voter Buying: Shaping the Electorate through Clientelism." *American Journal of Political Science* 60 (2): 436-455.
- de Kadt, D., and H.A. Larreguy. (2018). "Agents of the Regime? Traditional Leaders and Electoral Politics in South Africa." *Journal of Politics* 80(2): 382–99.
- Kasara, K., and I. Mares. (2017). "Unfinished Business: The Democratization of Electoral Practices in Britain and Germany." *Comparative Political Studies* 50(5): 636–64.
- Kousser, J. M. (1974). *The Shaping of Southern Politics: Suffrage Restriction and the Establishment of the One-Party South, 1880-1910*. New Haven: Yale University Press.

Larreguy H., C. Olea, and P. Querubín. (2017). “Political Brokers: Partisans or Agents? Evidence from the Mexican Teachers’ Union.” *American Journal of Political Science* 61 (4): 877-891.

Leemann, L., and I. Mares. (2014). “The Adoption of Proportional Representation.” *Journal of Politics* 76(2): 461–78.

Limongi, F. (2015). “Fazendo Eleitores e Eleições: Mobilização Política e Democracia no Brasil Pós-Estado Novo.” *Dados* 58(2).

Lizzeri, A., and N. Persico. (2004). “Why Did the Elites Extend the Suffrage? Democracy and the Scope of Government, with an Application to Britain’s ‘Age of Reform.’” *Quarterly Journal of Economics* 119(2): 707–65.

Mares, I. (2015). *From Open Secrets to Secret Voting: Democratic Electoral Reforms and Voter Autonomy*. New York: Cambridge University Press.

-----, A. Muntean, and T. Petrova. (2018). “Economic Intimidation in Contemporary Elections: Evidence from Romania and Bulgaria.” *Government and Opposition* 53 (3): 1–32.

Morgan, J., and F. Várdy. (2012). “Negative vote buying and the secret ballot.” *Journal of Law, Economics, & Organization* 28, no. 4: 818-849.

Novaes, LM. (2018). “Disloyal Brokers and Weak Parties.” *American Journal of Political Science* 62(1): 84–98.

Oliveros, V. (2016). “Making it personal: Clientelism, favors, and the personalization of public administration in Argentina.” *Comparative Politics* 48 (3): 373-391.

Perman, M. (2001). *Struggle for Mastery: Disfranchisement in the South, 1888-1908*. Chapel Hill: The University of North Carolina Press.

Przeworski, A. (2015). “Suffrage and Voting Secrecy in General Elections.” In *Secrecy and Publicity in Votes and Debates*, ed. Jon Elster. New York: Cambridge University Press, 97–107.

do Rêgo, AH. (2008). *Família e Coronelismo No Brasil: Uma História de Poder*. São Paulo: Girafa.

Reynolds, A, and M Steenbergen. (2006). “How the World Votes: The Political Consequences of Ballot Design, Innovation and Manipulation.” *Electoral Studies* 25(3): 570–98.

Rueda, MR. (2015). “Buying Votes with Imperfect Local Knowledge and a Secret Ballot.” *Journal of Theoretical Politics* 27(3): 428–56.

-----, 2017. “Small Aggregates, Big Manipulation: Vote Buying Enforcement and Collective Monitoring.” *American Journal of Political Science* 61(1): 163–77.

- Samuels, D. (2001). *Ambition, federalism, and legislative politics in Brazil*. New York: Cambridge University Press.
- Smith, A, and B. Bueno De Mesquita. (2012). “Contingent Prize Allocation and Pivotal Voting.” *British Journal of Political Science* 42(2): 371–92.
- Stokes, SC., T Dunning, M Nazareno, and V Brusco. (2013). *Brokers, Voters, and Clientelism: The Puzzle of Distributive Politics*. Cambridge University Press.
- Trebbi, F., P. Aghion, and A. Alesina. (2008). “Electoral Rules and Minority Representation in U.S. Cities.” *Quarterly Journal of Economics* 123(1): 325–57.
- Ziblatt, D. (2008). “Does Landholding Inequality Block Democratization?: A Test of the ‘Bread and Democracy’ Thesis and the Case of Prussia.” *World Politics* 60(4): 610–41.
- Zucco Jr, C., and J.M. Nicolau (2016). Trading old errors for new errors? The impact of electronic voting technology on party label votes in Brazil. *Electoral Studies* 43, 10-20.

VIII. ONLINE APPENDIX

VIII.A. *Derivations for the Game-Theoretic Model*

Graphical Characterization of Equilibria under the Secret Ballot Regime. Figure A1 displays fixed point graphs illustrating the four patterns of equilibria under the secret ballot regime that emerge at varying levels of μ . In each graph, the expected margin is arrayed along the x-axis and the actual margin of victory is arrayed along the y-axis. Equilibrium margins are the points where the actual margin intersects with the 45 degree line.¹⁶ If there is either very strong intrinsic support for I among literate voters ($\mu < \mu_1 < 0$) or very strong intrinsic aversion to I among the same ($\mu > \mu_3$), then these voters will anticipate that the election will not be close. In either scenario, they will discount entirely their influence on the election outcome and ignore the material benefit offered by I . In other words, clientelism breaks down entirely. These settings are represented by the upper lefthand and lower righthand panels of Figure A1, respectively.

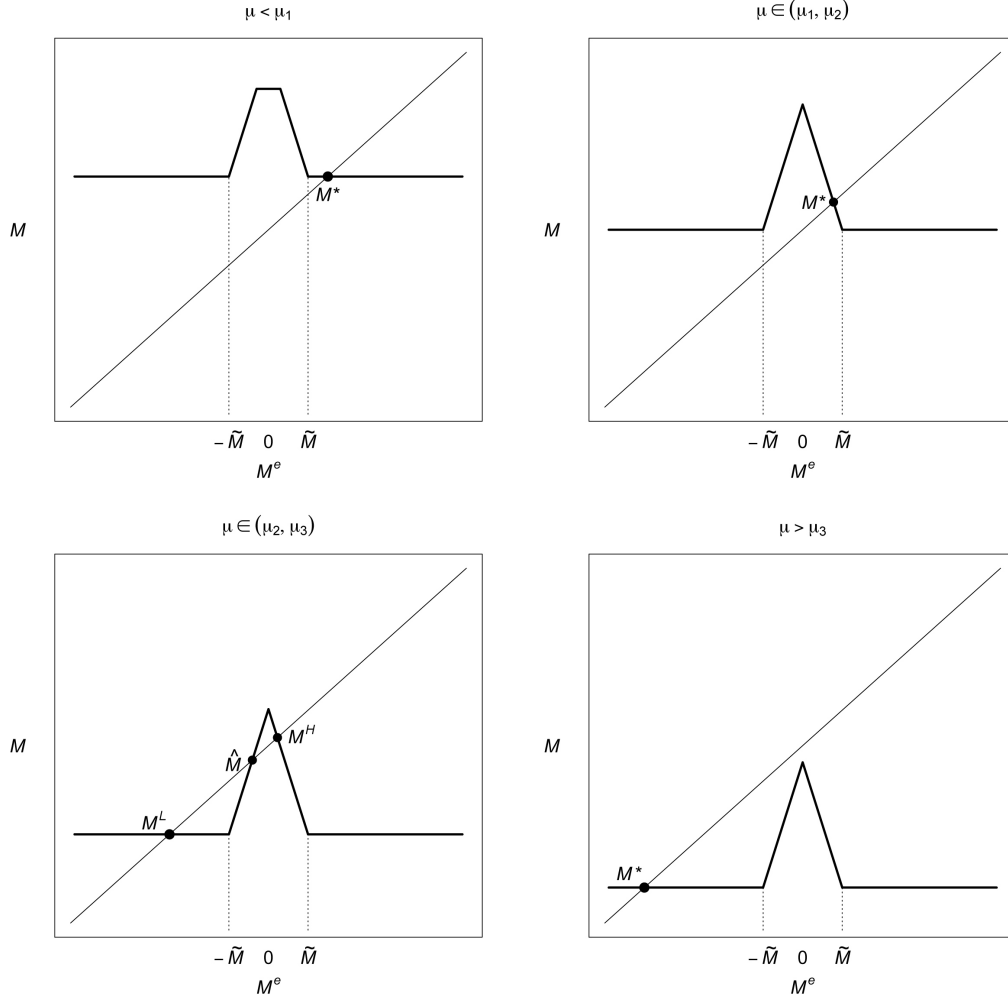
Alternatively, if literate voters do not strongly differentiate the two candidates on non-material grounds, then they will anticipate a close race in which their votes can have a real impact. As a consequence, they will indeed factor the material benefit into their voting calculation and herding behavior will ensue. If literate voters are close to being indifferent between the candidates on non-material grounds ($\mu_1 < \mu < \mu_2$), then a single equilibrium margin will nevertheless obtain. This situation is represented by the upper righthand panel of Figure A1.

However, if literate voters lean slightly against I on material grounds ($\mu_2 < \mu < \mu_3$), then the compensating effect of the material benefit makes the election especially close. Here intense herding generates three equilibrium values of M : a low equilibrium (M^L), a high equilibrium (M^H), and an intermediate equilibrium (\widehat{M}). The highest and lowest of these equilibria are

16. In what follows, we focus on the typical scenario in which \widetilde{M} is much smaller than N , such that the parameter restriction $\widetilde{M} < \sqrt{2N\sigma h\theta}$ is always satisfied. Were the inequality not satisfied, the slope of the margin curve would lie beneath the 45 degree line, thereby eliminating the prospect of multiple equilibria.

stable, in the sense of being robust to small perturbations, whereas the intermediate equilibrium is not. This final scenario is depicted in the lower lefthand panel of the Figure.

Figure A1: Equilibrium Margins of Victory under the Secret Ballot



Solving for Equilibria under the Secret Ballot Regime. Let us begin by defining the following threshold values of μ :

$$\begin{aligned}
 \mu_1 &\equiv \mu | M(\tilde{M}) = \tilde{M} \\
 \mu_2 &\equiv \mu | M(-\tilde{M}) = -\tilde{M} \\
 \mu_3 &\equiv \mu | M(0) = 0.
 \end{aligned}
 \tag{13}$$

Solving these expressions gives $\mu_1 = -\frac{\tilde{M}}{2N\sigma h}$, $\mu_2 = \frac{\tilde{M}}{2N\sigma h}$, and $\mu_3 = \frac{\theta}{\tilde{M}}$, where $\mu_1 < 0 < \mu_2 < \mu_3$.

Consider first the case where $\mu < \mu_1$. This generates a fixed point graph as in the upper lefthand panel of Figure A1, with only a single equilibrium value of M^* . In this instance, the equilibrium is defined by equation (8), with $\Delta(M^*) = 0$. This gives:

$$(14) \quad M^* = -2N\sigma h\mu > 0.$$

Now suppose that $\mu_1 < \mu < \mu_2$. In this case, the fixed point graph is as in the upper righthand panel of Figure A1, again with only a single equilibrium value of M^* . Equation (8) defines the equilibrium, with $\Delta(M^*) = (\widetilde{M} - M^*)/\widetilde{M}^2$. Thus,

$$(15) \quad M^* = \frac{h\theta/\widetilde{M} - h\mu}{1/2N\sigma + h\theta/\widetilde{M}^2} > 0.$$

Now consider the case where $\mu_2 < \mu < \mu_3$. This produces a fixed point graph like in the lower lefthand panel of Figure A1, with three equilibria. The low equilibria, M^L , is equal to the quantity in (14) (however, in this case the low equilibrium margin is negative since μ is positive). The high equilibrium margin, M^H , is equal to the expression in (15). The intermediate equilibrium, \widehat{M} , is defined by equation (8), with $\Delta(M^*) = (\widetilde{M} + M^*)/\widetilde{M}^2$. Thus,

$$(16) \quad \widehat{M} = \frac{h\theta/\widetilde{M} - h\mu}{1/2N\sigma - h\theta/\widetilde{M}^2} < 0.$$

Finally, consider the case where $\mu > \mu_3$. Here the fixed point graph is as in the lower righthand panel of Figure A1, with only a single equilibrium value of M^* . It is negative and equal to the quantity in equation (14).

The above values for the equilibrium margins determine the equilibrium values of the vote impact function. As described above, for $\mu < \mu_1$ and $\mu > \mu_3$, one has $\Delta(M^*) = 0$. Similarly, if $\mu_2 < \mu < \mu_3$, and the low equilibrium obtains, this gives $\Delta(M^L) = 0$ since $M^L < -\widetilde{M}$.

However, for the unique equilibrium margin M^* occurring when $\mu_2 < \mu < \mu_3$ and the high equilibrium margin occurring when $\mu_2 < \mu < \mu_3$, one has:

$$(17) \quad \Delta(M^*) = \Delta(M^H) = \frac{1}{\widetilde{M}} - \frac{h\theta/\widetilde{M}^3 - h\mu/\widetilde{M}^2}{1/2N\sigma + h\theta/\widetilde{M}^2}.$$

Impact of N on the Vote Impact Function. Using the expression above, one can differentiate with respect to N ,

$$(18) \quad \frac{\partial \Delta(M^*)}{\partial N} = \frac{\partial \Delta(M^H)}{\partial N} = - \frac{\frac{h\theta}{\widetilde{M}} - h\mu}{2\sigma N^2 \widetilde{M}^2 \left(\frac{1}{2N} + \frac{h\theta}{\widetilde{M}^2} \right)^2} < 0.$$

VIII.B. Recorded Roll Call Votes on the AB in Brazil, 1955-1962

The first recorded roll call vote, taking place on June 28, 1955, was on an amendment to institute the use of the AB for all elected offices in Brazil. Since the presidential elections were to be held in October of that year, the consequences of the AB for that contest were foremost in the comments and stances of political parties at the time. The amendment, ultimately defeated, proposed that the official ballot to be used in proportional representation elections would require the use of identifying numbers to vote for individual candidates; in this sense, it was similar to the format of the AB that was later adopted in the country.

The second vote, taking place on June 21, 1958, was a vote on granting urgency status to a bill, PL 3.159/57 (“projeto Ferrari”), to institute the use of the AB in proportional representation elections. The urgency vote—which passed—was critical, for had it failed there would have been no possibility of the AB coming into effect for the proportional representation elections of that year.

The third vote, taking place on November 8, 1958, was on a substitute bill prepared by the Commission on Justice and the Constitution to replace PL 3.159/57. The main difference between the bills consisted of their relative unfriendliness to illiterate voters. Whereas the original bill organized the ballot into party columns with the names of each candidate in a party listed (in alphabetical order) under his party label, requiring the voter to mark with an

“X” or “+” the candidate of his choice, the substitute bill, which passed, did not list names, instead requiring that voters wishing to vote for a specific candidate do so by writing in the name or identifying number of that individual. Consequently, a vote for the substitute can be interpreted as a vote to make the ballot more inaccessible to voters with low literacy.

The final recorded vote took place on June 28, 1962, after several years in which the proposed AB reform worked its way through the Senate. This was an another urgency vote. The proposed legislation advanced the electoral framework that would ultimately be implemented for the 1962 elections and those that followed: the AB in place for proportional representation elections using a write-in name or number system.

VIII.C. Dataset Preparation

This appendix describes how we constructed the dataset examined in this paper. The final product has as its units federal deputies who voted on the Australian Ballot (AB) in Brazil during the 1950’s and 1960’s in Brazil. For each legislator, there are variables indicating how they voted in each roll call, their biographical information, and sociodemographic characteristics of their electoral bases (which take into account the proportion of votes they had in each municipality within the district they represent). To produce this final dataset, we gathered five source datasets: (1) recorded votes in the Brazilian Chamber of Deputies, (2) the 1954 and 1958 federal deputies’ electoral returns at the municipal level, (3) biographical information, (4) demographic census, and (5) agrarian census.

Recorded votes were collected from official documents produced by the National Congress. Electoral results came from the archives of regional electoral courts (TREs). Biographies of those who voted on the AB are available at the Center for Research and Documentation of Contemporary History of Brazil of the Getúlio Vargas Foundation (CPDOC-FGV). The demographic and agrarian census data were collected from the original tabulations made by the Brazilian Institute of Geography and Statistics (IBGE) in 1960.

To merge the data from these sources, two variables were crucial: the name of candidates/federal deputies and the name of municipalities. Electoral returns and recorded votes

include both variables. The biographical data only contains the name of the deputies. Census documents only contain the names of municipalities.

Our first task was to calculate, for each deputy, the proportion of votes received in each municipality relative to his vote total. Excluding zeros, each candidate had as many entries in the file as municipalities that cast at least one vote for him/her.

The next step was to merge this file with the census data. The key to merging them was the name of the municipality. One challenge in the merging process was the presence of minor variation in the spelling of municipalities' names across the two files. This was due to the fact that different public agencies sometimes use slightly different spelling for the same municipality. In Portuguese, different spellings can produce the same sound - for instance, the town of Xavantes was occasionally written as Chavantes in official documents during the 1950s and 1960s. To deal with this issue, we checked all cases that did not have a perfect spelling correspondence. Every time a difference in spelling was detected the necessary corrections were made.

Another issue that arose was the creation of new municipalities. Given that we are working with electoral results from 1954 and 1958 and census from 1960, there are some municipalities that came into existence between these time period. Other towns disappeared - due to fusions - between the elections and the census. Our decision was to keep the municipalities from the electoral returns as the base for the merging. There were very few cases in which no correspondence was present in the census data. These had to be discarded from our analysis. We also acknowledge that some municipalities might have suffered territorial modifications to accommodate changes in the number of municipalities over the 1950s. To the best of our knowledge, however, this does not seem to be a major concern.

For the state of Sergipe we had to create sociodemographic statistics for what we called "super-municipalities". Sergipe's electoral returns are available the level of the electoral zone, which often encompasses more than one city or town. Due to the lack of electoral returns at the municipal level, we treated the set of municipalities in a given electoral zone as if they constituted a single municipality.

Once these issues were resolved, we merged the electoral returns and the census data using municipality names. Subsequently, we calculated the weighted averages of the sociodemographic variables by federal deputy candidate (cf. section on measurement). This procedure creates two files, one for each election. The units are federal deputy candidates.

The next step consisted of merging these files with the recorded votes. The 1955 and 1958 votes were merged with the weighted averages of sociodemographic variables based on the 1954 elections because the legislature started in 1954 and ended on January, 1959. The 1962 vote was merged with the file based on the 1958 electoral returns because the legislature ran from 1959 until January, 1963. Merging in this case was based on the names of the candidates/federal deputies. This presented two challenges. In several instances, deputies did not use the same name in Congress as the name they adopted as a candidate. For instance, some legislators showed up in the congressional record based on only their first and last names while the electoral records for their candidacy showed their full name (including maternal surname). Second, in some instances there were multiple spellings used for the same name. We checked all cases that did not have a perfect correspondence and the names were adjusted accordingly.

After the above steps were completed, our data included the federal deputy, his/her vote on the specific roll call, and weighted averages of the sociodemographic variables. The final step in the process was to add the biographical information for federal deputies (based on their names). After that was accomplished, the dataset was ready to be analyzed.

Table A1: Summary statistics of personal characteristics of legislators - All roll calls

	N	Mean	St. Dev.	Min	Max
Minister	640	0.04	0.20	0	1
Agency Head	640	0.04	0.21	0	1
Governor	640	0.02	0.14	0	1
State Secretary	640	0.23	0.42	0	1
Mayor	640	0.20	0.40	0	1

Table A2: Summary statistics of the socio-demographic variables at the legislator level - All roll calls

	N	Mean	St. Dev.	Min	Max
Literacy	641	57.5	17.1	25.5	81.9
Industrial	641	5.8	4.8	0.278	26.0
Agriculture	641	11.3	7.2	0.745	40.3
Size of electorate	636	230,354	354,596	3,367	1,099,490
Landholding inequality	641	0.70	0.08	0.29	0.87

Table A3: Summary statistics of socio-demographic variables, all of Brazil - municipality level

	N	Mean	St. Dev.	Min	Max
Literacy	2,703	46.3	16.6	6.7	89.9
Industrial	2,709	2.3	4.4	0.00	63.1
Agriculture	2,709	19.3	20.7	0.00	250.7
Size of electorate	2,631	5,812	34,265	100	1,271,323
Landholding inequality	2,715	0.66	0.14	0.00	0.99

Table A4: Summary statistics of socio-demographic variables, only states included in analysis - municipality level

	N	Mean	Std. Dev.	Min	Max
Literacy	1,948	49.4	15.9	11.1	89.9
Industrial	1,948	2.6	4.8	0.00	63.1
Agriculture	1,947	18.3	17.5	0.00	250.7
Size of electorate	1,905	6,526	39,978	213	1,271,323
Landholding inequality	1,946	0.67	0.13	0.00	0.98

Table A5: Impact of Constituency and Personal Characteristics on Non-Party Line Votes for the Official Ballot, 1958-1962 (Excluding absentees) - Logistic Regression

	pooled roll calls		1962 only	
literacy	0.73*** (0.20)	0.76* (0.42)	0.76*** (0.30)	1.32** (0.56)
agriculture		0.09 (0.29)		0.24 (0.48)
industrial		-0.04 (0.30)		-0.72 (0.42)
landholding		-0.36** (0.17)		-0.62 (0.28)
land \times agriculture		0.27 (0.20)		0.27 (0.30)
electorate		0.13 (0.20)		0.52 (0.41)
mayor	-0.72*** (0.21)	-0.75*** (0.25)	-1.20*** (0.36)	-1.46*** (0.33)
governor		0.34 (0.98)		-0.15 (1.03)
minister		0.01 (0.65)		-0.48 (0.62)
agency.head		-0.27 (0.55)		-0.56 (0.65)
state.secretary		0.25 (0.32)		1.28** (0.52)
(Intercept)	1.48 (1.51)	1.74 (1.31)	1.88 (1.17)	2.72** (1.11)
AIC	327.21	330.56	188.44	188.28
Num. obs.	284	280	159	157
Include party dummies?	Y	Y	Y	Y
Include roll call dummies?	Y	Y	N	N

Note: Cluster robust standard errors in parentheses (clustering on state); *** statistical significance at the 99% level, ** 95% level, and * 90% level (two-sided tests).

Figure A2: Correlation between Explanatory Variables - Legislators

Correlation matrix of socio-demographic variables and personal characteristics at the level of the legislators

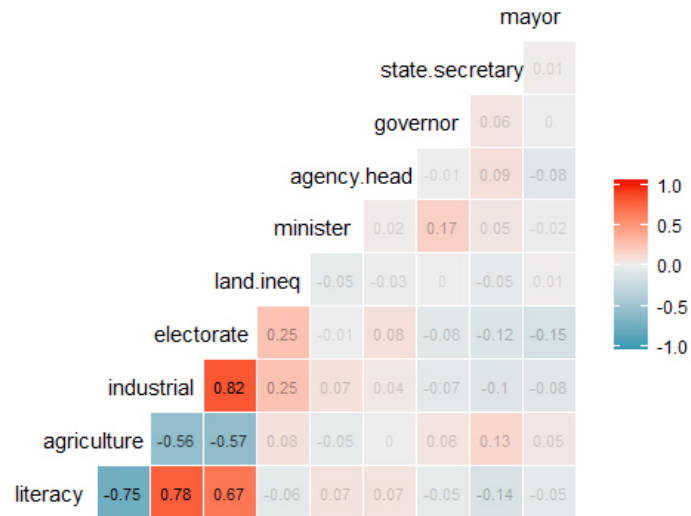


Figure A3: Correlation between Demographic Variables - Municipalities in all of Brazil

Correlation matrix of socio-demographic variables, Brazil 1960 - municipality level

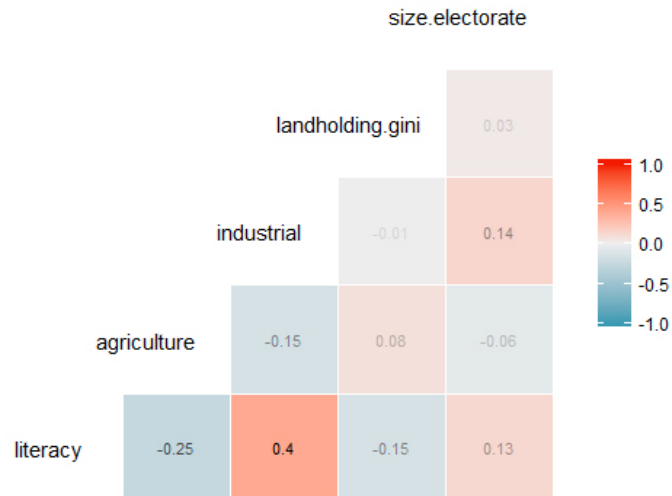


Figure A4: Correlation between Demographic Variables - Municipalities in States included in Sample

Correlation matrix of socio-demographic variables,
only states included in the analysis - municipality level

