Land and Power and the impact of the 1958 electoral reform in Chile

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Abstract

We study the implications of vote buying for political equilibria and economic resource allocation. We develop a model of a ‘market for votes’ where votes may be bought and sold and distinguish between direct vote

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buying, when individuals sell their own votes to political parties, and indirect vote buying, when some individuals sell the votes of others. We show that the attraction of indirect vote buying to parties is that it can make votes cheaper to buy. We show that direct vote buying changes the political equilibrium when parties valuations of votes are sufficiently different, while the addition of indirect vote buying alters the outcome when parties valuations are sufficiently close, or when the ideological preferences of the voters are stronger. In particular, we show that an effective market for votes may not exist under direct vote buying, but develops with indirect vote buying. Further, we demonstrate that while direct vote buying is socially efficient, indirect vote buying is inefficient in exactly the circumstances where it changes political outcomes. We then provide a microfoundation for why some individuals sell the votes of others in equilibrium. If the employment relationship is subject to moral hazard then the resulting rents conceded by employers to workers gives them a comparative advantage in controlling the political activities of their workers. This generates an added incentive to own land and increases the demand for labor. We test the predictions of the model by examining in detail the effects of the introduction of the secret ballot in Chile in 1958. We show that, consistent with our theory, the political reforms led to large changes in voting behavior. Before the reforms, localities with more pervasive patron-client relationships tend to exhibit a much stronger support for the right-wing parties, traditionnally associated with the landed oligarchy. After the reform however, this difference across localities completely disappeared. We also test for the existence of a structural break in land prices on an original set of land price data, and we show that land prices fall after the reform, and that the fall is more pronounced in exactly those provinces dominated by the landed oligarchy.
“It is the most cruel mockery to tell a man he may vote for A or B, when you know that he is so much under the influence of A, or the
friends of A, that his voting for B would be attended with the destruc-
tion of him. It is not he who has the vote, really and substantially, but
his landlord, for it is for his benefit and interest that it is exercised in
the present system.” David Ricardo ([1824], 1951-1973, p. 506)

1. Introduction

The collective choices a society makes are mediated by its political institutions. Within social science, key distinctions are made between democratic and non-
democratic institutions and many scholars have studied variation within both. For
instance, one can consider many types of dictatorships, with the seminal study
of Linz and Stepan (1996) distinguishing between totalitarian, post-totalitarian,
sultanistic and authoritarian dictatorships. Democracies also differ along many
dimensions, for example, whether or not they have a president and the form of
the electoral system they use (Cox, 1997, Lijphart, 1999, Persson and Tabellini,

What makes a country’s political institutions democratic? The most basic
requirement is that there be freely contested elections where all adult individuals
can express their preferences. The extent to which this happens will depend on
specific details of the voting and balloting procedure. Although we commonly
believe that a foolproof secret ballot is the sine qua non of democracy, this has
not always been the case. The 19th century United States was considered to
be relatively democratic by many, and certainly by de Tocqueville (1835) since
universal white male suffrage was attained by 1850 (Keyssar, 2000, Engerman and
Sokoloff, 2001), yet voting was not secret until the late 1880’s when the Australian
ballot was introduced.¹ In Britain, the liberalization of the political system took
place with the Reform Acts of 1832 and 1867, but until 1872 voting was open,

¹The ‘Australian ballot’ has become synonymous with perfectly secret voting and refers to
a situation where all political alternatives are on a single government produced ballot paper. It
derives its name from the fact that the first use of such a ballot was in Australia in 1856.
not secret. In Latin America, Chile was long regarded as the sub-continent’s most
democratic country, yet the Australian ballot was not introduced until 1958 and
in Colombia, the country which has the longest experience of formal democracy in
Latin America and where the military has played the most marginal of political
roles, the equivalent of the Australian ballot was legislated only in 1988 and
introduced in 1990.

There can therefore be democracy with and without an Australian ballot.\(^2\)
Indeed, at an abstract level one can imagine that in a democracy where voting was
observed, individuals could buy and sell votes freely, perhaps to other people or
to political parties. Such practices are not obviously undemocratic and have even
been argued to promote social efficiency (Buchanan and Tullock, 1962). However,
when voting can be observed other, more sinister forces, may come into play. For
example, people may be coerced into voting against their will, or people may use
the existence of other types of market or social relationships to induce people to
vote against their preference. More generally, various types of ‘corrupt practices’
may emerge.

In this paper we try to develop an understanding of the role and some of the
implications of vote buying and the secret ballot. Though the importance of vote
buying and selling has not been investigated by economists, there is a large case
study literature on this topic by other social scientists. While there are recorded
instances of a market operating where people freely buy and sell their votes in the
absence of a secret ballot, the main stylized fact which emerges from this literature
is the importance of indirect control of votes. Typically, rather than individuals
selling their votes to politicians, others, usually employers, supply the votes of
their employees in exchange for money, favors or policies. More specifically, as
discussed by Ricardo (1824), employers are usually landlords.

That landlords control the political activities of their workers is a pervasive
characteristic of agrarian economies.\(^3\) In Britain, before the introduction of the

\(^2\)Currently France does not use an Australian ballot since each political party has a different
ballot paper.

\(^3\)As Malefakis (1970, p. 98) summarized the situation in nineteenth century rural Andalucía,
“a man’s job depended on his vote.”
secret ballot, this factor was critical in determining the outcome of rural elections. As observed by Lord Stanley in 1841,

> “when any man attempted to estimate the probable result of a county election in England, it was ascertained by calculating the number of the great landed proprietors in the county and weighing the number of occupiers under them.”

Throughout the nineteenth century radicals and reformers complained about the lack of a secret ballot in Britain. The reformer E.A. Leatham noted in 1870 the “prevailing form of influence which ... results ... from the mutual relations subsisting between landlord and tenant,” and which “operates as powerfully at an election as though it were backed up by daily acts of oppression,” (quoted in Moore, 1976, p. 410, see also Kinzer, 1982). As Cox (1987, p. 38) puts it “landlords greatly influenced the votes of their tenants, and a similar relationship held between employers and their men, between important customers and the shopkeepers to whom they gave their custom and so on.” Gash concludes (1977, pp. 174-175) “wherever in ordinary social and economic relationships there existed authority on the one side and dependence on the other, political influence was always liable to be exercised.”

In Germany, despite the fact that a democratic parliament was introduced in 1848 there is a mass of evidence that rural voters were controlled by landed interests. Interestingly, Bismarck even supported an extension of voting rights in 1871 because he thought that the control exercised by landlords over rural voters would offset the rising influence of urban workers (see Gosnell 1930). Bendix’s

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4Quoted in Kitson-Clark (1951, p. 112). O’Gorman (1989, p.20) estimates that by 1807 this resulted in the outcomes of 300 parliamentary seats being a foregone conclusion. He describes in detail the system of patronage linking high politicians such as Walpole with members of parliament, typically Whig ‘oligarchs,’ who controlled the local electorate, noting (p. 22) “governments won every single national election in the century before reform [in 1832]. They did so through an intricate, informal web of contacts relationships, and friendships with well disposed private patrons.” Interestingly, the period after this consolidation of control over the electorate saw large increases in land concentration in Britain and mass enclosures of common lands (on this see Plumb, 1967).
analysis suggests that this mechanism was widespread, noting (1964, p. 97) “Liberals ... feared the possibilities of electoral manipulation inherent in the extension of suffrage to the economically dependent. Conservatives, once they recognized the importance of the vote as a basis for local power, tended to favor the enfranchisement of the ‘lower orders’” (see Hamerow 1974, pp. 299-300 for further evidence).

Landlords control over rural elections was greatly facilitated where balloting was open (see Goldstein, 1983, p. 15). However, even when there was a supposedly secret ballot (and not open voting), strategies were found to keep voting under control. Thus, in the German case, political parties often printed their own ballots: “given that ballots had to be obtained from the candidates themselves or from their agents, it was often physically impossible for a poor man to vote for anyone but the squire’s choice.” (Anderson, 1993, p. 1467) Even countries, such as France which moved early to universal male suffrage (after 1848) and free elections (after 1871) only introduced an effective (though non-Australian) secret ballot in 1913. Before this “the ballots frequently had subtle but distinct marks, such as paper thickness, colour and size, from which the election officials could deduce a voter’s decision. This information was then passed on to notables who could easily punish such wayward voters since they frequently were his tenants or employees,” (Kreuzer 1996, p. 108).

Similar tactics were used and remain up to the present day in democratic third world countries. Perhaps nowhere is the evidence about landlord control of elections so conclusive as in Latin America. Following independence most Latin American countries adopted liberal constitutions committing themselves to regular elections, yet, with few exceptions, for example Costa Rica after 1948,

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5For further evidence on the German case see Blackbourn (1988) and the section on Germany in Gibson and Blinkhorn (1991).

6For evidence from India see Kohli (1990), who notes that in the state of Bihar big landlords (p227-228) “hold near-absolute economic, social and political power in their respective areas. In Belchhi it was Mahavir Mahato, in Gopalpur it was Birendra Singh; the landlords of Dharampura and Chaudadano were led by mahans who were the biggest landlords of their respective areas. In each case the big landlord concerned is basically the “raja” of his area...to the social, economic and military power of the raja, “democracy” had added political power.” This evidence is also supported by that from Gujarat in Breman (1974).
Latin American societies did not become consolidated democracy with free regular elections contested by all adults until the 1980’s.\(^7\) In Chile an effective secret ballot was introduced only in 1958, and before that there was well documented control of the votes of rural dependent workers (inquilinos) by landowners. This electoral corruption again worked because the parties issued their own ballot papers which were different colors.\(^8\) This issue was very frankly discussed in the congressional debate leading up to the introduction of the secret ballot in language strikingly similar to that used by Lord Stanley quoted above. For example, Socialist senator Martones argued in favor of introducing the secret ballot because,

> “if that law [the old electoral law without a secret ballot] did not exist, instead of there being 9 Socialist senators there would be 18, and you [the Conservatives] would be reduced to 2 or 3 ... [laughter] you laugh, but the truth is that there would be not 2 Conservative senators from O’Higgins and Colchagua, which corresponds exactly to the number of inquilinos in the fundos which belong to the Conservative hacendados in that region. Conservatives would have only one or perhaps none.”\(^9\)

We focus our analysis on several issues. First, we analyze how a ‘market for votes’ might work where, in the absence of a secret ballot, individual votes are contractible and may be bought and sold, a process we call \textit{direct vote buying}. We study the circumstances under which this changes the political equilibrium relative to a situation where there is no market for votes, a situation we associate with an effective secret (usually Australian) ballot.

Second, we study \textit{indirect vote buying}, where some individuals control and sell the votes of others. Initially we treat the incidence of such control as exogenous and study its implications. One important result is that buying votes indirectly may be cheaper for political parties and this helps to explain why it is so prevalent


\(^8\)On this see Loveman (2001, pp. 222-3).

\(^9\)A “fundo” is a large farm and a “hacendado” a large landowner. Quoted in \textit{El Mercurio}, Saturday May 19, 1958, p. 20.
in reality. Next we provide a microfoundation for why indirect vote buying might be possible. We argue that employment and political control are deeply connected when the employment relationship concedes rents to workers. For example, when worker effort is crucial for production, but only imperfectly observed, landlords may have to concede rents to induce effort. These rents allow landlords to influence other activities of workers, particularly their political behavior. We show that even if political behavior (such as voting) is contractible, the fact that landlords already concede rents to workers for some other reason gives them a comparative advantage in the control of their political activities. We thus demonstrate that employment does not simply generate income, it also gives power to control the behavior of others.

We then study the implications of this phenomenon for the functioning of the land market. The desire to attain power over others and the benefits it brings may significantly influence the way the land market functions because of the complementarity between labor and land in production. Being able to sell the votes of their workers induces landlords to hire workers and consequently attempt to buy more land. In equilibrium, land prices incorporate the political rents that follow from the control of the votes of the workers employed on it.

Our focus in this paper on the implications and microfoundations of vote controlling and the functioning of the market for votes means that we shall abstract from other potentially important issues, particularly the impact of vote buying and vote controlling for public policy. One can justify this focus more formally by assuming that while political parties may enter into contracts to buy votes, they cannot commit to public policies.

The model has several important empirical predictions with respect to the impact of political reform on land prices, employment and voting patterns. If political reform occurs which closes down the market for votes then the incentive to employ people to control their voting vanishes, and employment should fall. Moreover, since the demand for land falls, so should its equilibrium price. Finally, we should observe large changes in voting behavior since workers whose votes were previously sold can now vote freely.

We examine these implications by considering the electoral reforms which took
place in 1958 in Chile. Many scholars have claimed that, before the reforms, there was widespread control of voting behavior in the countryside which were ended by the successful introduction of the secret ballot in 1958. Closely related to our research strategy, Hellinger (1978) proposed an analysis of electoral change in the Chilean countryside for the two presidential elections of 1958 and 1970. Though his study is based on the analysis of correlations on a restricted (and biased) sample of municipalities, he points out the ‘erosion of support for the Right as the correlation between the vote for the Nationalists and the proportion of inquilinos in the agricultural workforce changes from .32 in 1958 to -.13 in 1970.'\textsuperscript{10} This observation is at the heart of the test we provide in section 5. We therefore collected data on land concentration, land prices, the employment of dependent laborers (inquilinos) and voting outcomes before and after the reform to see if the implications of our model were consistent with what happened.

We show in section 5 that the empirical predictions of our model are highly consistent with the data. We first demonstrate that before 1958 there exists a close association between the employment of inquilinos and right-wing support, particularly in those provinces of Chile where control of voting was endemic. These were the traditional ‘oligarchic’ provinces of the so-called North and Urban Central Valley provinces, such as Colchagua, O’Higgins, Santiago and Talca. Moreover we also show that, even within provinces, the support for right-wing parties was, before the reform, substantially higher but fell substantially more thereafter in precisely those municipalities were inquilinos formed a larger share of the electorate. We also discuss the fall in employment of inquilinos that followed the 1958 electoral reform. Finally we show that land prices also fell after 1958 in a way consistent with our theory since this fall was larger in the oligarchic provinces. We also present a variety of other pieces of evidence which support our interpretation.

To our knowledge, nobody has developed a model of vote buying as an electoral

\textsuperscript{10}He however fails to provide a consistent explanation for this change in rural voting pattern, ascribing it to the increased class polarization that occurred between the two elections, and instead examines the impact of other changes, such as mechanization, on the electoral results in Chile.
strategy or systematically studied its implications for resource allocation. To the extent that the social science literature has made predictions about what happens when there is not an Australian ballot these are along the lines of those noted by Scott (1972, p. ix) when he says

“the normal effect of [political] corruption is to cement together a conservative coalition and hold back or cancel out the effects of growing collective demands.”

This literature focuses very much on coercion and corruption and it does not make clear predictions about how vote buying influences the economy. Moreover, it has not tackled the key question of why vote controlling exists and if it implies different things from simply vote buying or coercion.

A related literature in economics (e.g. Buchanan and Tullock, 1962) suggests the idea that allowing votes to be bought and sold promotes social welfare because it takes advantage of unexploited gains from trade. We show that when there is only direct vote buying then the political equilibrium is indeed efficient in the strong sense discussed by Buchanan and Tullock. However, once indirect vote buying occurs, the equilibrium is inefficient in exactly the case where such a practice changes the outcome of the election. This is because an agent who controls the votes of others sells the votes to the highest bidder and in doing so ignores the preferences of those who are controlled. The sale of votes takes place even though the value of voting freely for the voter exceeds the value of his vote for the buying party.

Scholars in political economy such as Snyder (1991) and Grossman and Helpman (1996) have looked at interest groups buying politicians with ‘campaign contributions’ but this work also focuses on very different issues than those we study. An important distinction is that these scholars, and most others in the political

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11 Following on this literature, Piketty (1999, 2000) shows that when voters have private information about the socially efficient policy, such vote trading may be inefficient because people who are well informed, but uncertain of this, may sell their votes to people who are badly informed. These exchanges stop valuable information being revealed.

12 As discussed in Baland and Robinson (2004), another source of inefficiency originates from the fact that indirect vote buying reduces state’s incentives to offer public goods.
economy literature focus on the efficiency of government policy. We focus on the way in which the presence of vote buying and vote controlling affects the way the economy is itself organized. Most closely related to our research, Summershill (1995) developed a simple model of the idea that political rents accrue to landowners and tried to estimate the impact of electoral reform on the economy using data from nineteenth century Brazil.

The paper proceeds as follows. In the next section we develop a basic model of elections where there is a market for votes. We study the nature of equilibria with and without vote controlling. In section 3 we provide our microfoundations for vote controlling and show how moral hazard gives landowners a comparative advantage in the control of political activities. In section 4 we embed this into the political model and show how this power increases the desire to hold land and increases equilibrium land prices. We derive important comparative static implications of political reform. In section 5 we study the Chilean case and section 6 concludes.

2. The Market for Votes

Consider a model with two sectors, rural and urban. We assume that votes in the rural sector can be bought while those in the urban sector cannot. The urban sector consists of $n^u$ individuals and the rural sector consists of $n^a$, with the superscript meant to indicate ‘agricultural’ sector. Here $n^u + n^a = n$. Individuals are differentiated according to their political ideology, where we differentiate between agents who are ‘left’, ‘center’ or ‘right’, and their location. All of the games we study are of complete information and the ideological orientation of all voters is known. In urban areas there are three types of individuals, $n_L^u$ left-wing people, $n_C^u$ centrist people and $n_R^u$ right people, thus $n_L^u + n_C^u + n_R^u = n^u$. In the agricultural sector there are only left-wing people, of number $n_L^a$, and right-wing people $n_R^a$, and $n_L^a + n_R^a = n^a$. We assume that $n^a + n_L^a < \frac{n}{2}$, $n^a + n_C^u < \frac{n}{2}$, and $n^a + n_R^a < \frac{n}{2}$. This distribution of people is motivated by the need for a pure strategy equilibrium to exist in the electoral model. They guarantee that none of the parties can ever attain an outright majority by buying all votes in the the
agricultural sector.

All individuals have utility functions of the form $x + \delta_j \sigma$ for $j = L, C, R$ and where $x$ is consumption and $\delta_j \in \{0, 1\}$. In this section we abstract from any economic activities so that the only source of consumption will be if a party pays for the vote of a voter. Here $\sigma$ is called the ideological bias, and corresponds to the utility that an individual of type $j$ gets in voting for his preferred party where $\delta_j = 1$ if he votes for such a party. If an individual of type $j$ is induced (or forced) to vote for any other party, then $\delta_j = 0$.

There are three political parties, one for each ideology, competing for votes to maximize their payoffs. We assume that the mapping from votes to seats is determined by proportional representation and therefore that the vote share of any party is identical to its seat share. Since, by construction, no party can form a majority, after any election a process of government formation will take place. We assume, following Baron and Ferejohn (1989), Austen-Smith (2000) and Baron and Deiermeier (2002) that this takes place in the following way. First, one party is chosen at random to form a government. The probability that any party is chosen is their seat share. The party that is chosen to form a government chooses one other party to negotiate with (any two parties will be able to form a majority) and makes a take-it-or-leave-it offer. Since there is complete information such an offer will be designed to be immediately accepted. Let $W^k_j$ denote the value of party $j = L, C, R$ when a government is formed by party $k$.

We assume that the only instrument available to parties to gain power is buying the votes of people in the agricultural sector.\(^{13}\) The price that a party offers for the vote of an agent will in general depend on the ideological type of the agent: let $p^k_j$ be the price paid by party $j = L, C, R$ to an individual of type $k$.\(^{14}\) We

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\(^{13}\) A rigorous justification would be that while other policies exist, the parties have no technology for committing to them (Alesina, 1988, Osborne and Slivinski, 1996, Besley and Coate, 1997) and therefore in the post election phase parties simply choose whatever policy emerges from the process of government formation. Then the $\sigma$ terms in the utility functions just represent the utility of citizens from the ex post policies of the parties.

\(^{14}\) Though we focus our analysis on situations where political parties directly purchase votes (a very common political phenomenon, historically in Europe and in contemporary Latin America, Asia and Africa), the model is consistent with other interpretations. For example, instead of buying votes, parties may offer policies which favor landlords, or give landlords elected positions.
assume that the sale of a vote for money is a contract that can be enforced in the absence of a secret ballot, this implies that an individual cannot sell his vote to one party while voting for another. If he does this then he is breach of the vote selling contract and we assume that he does not get the money for his vote.

To calculate the seat share of the left-wing party, \( s_L \), we shall use the notation \( v_{jk} \) to denote the number of voters of type \( j = L, R \) whose votes are bought by party \( k = L, C, R \). Given our assumptions, it follows easily that the seat share of the left-wing party is given by:

\[
 s_L = \frac{n^u_L + (n^o_L - v_{LL} - v_{LC} - v_{LR}) + v_{LL} + v_{RL}}{n}. \tag{2.1}
\]

To understand this expression, note that the \( n^u_L \) left-wing people in the urban sector always vote for the left-wing party. In the agricultural sector, the left-wing party gets the votes of the left-wing voters whose votes are not bought \((n^a_L - v_{LL} - v_{LC} - v_{LR} \geq 0)\) and those of the left and right wing people whose votes it buys (note that the left-wing party may need to offer to buy the votes of left-wing people in order to avoid other parties buying them). Thus, when all rural votes are bought, \( n^a_L - v_{LL} - v_{LC} - v_{LR} = 0 \), and the seat share of the left-wing party becomes:

\[
 s_L = \frac{n^u_L + v_{LL} + v_{RL}}{n}
\]

Similarly, the seat shares for the center and the right-wing parties can be written as:

\[
 s_C = \frac{n^u_C + v_{LC} + v_{RC}}{n}, \quad s_R = \frac{n^u_R + (n^o_R - v_{RL} - v_{RC} - v_{RR}) + v_{LR} + v_{RR}}{n}
\]

We can now write down the expected payoff \( E(\Pi_k) \) to party \( k \) as a function of the votes all parties buy. For \( L \) this is,

\[
 E(\Pi_L) = s_L W^L_L + s_C W^C_L + s_R W^R_L - M_L, \\
 = \frac{n^u_L + v_{LC} + v_{RC}}{n} W^C_L + \left( \frac{n^u_L + (n^o_L - v_{LL} - v_{LC} - v_{LR}) + v_{LL} + v_{RL}}{n} \right) W^L_L \\
 + \left( \frac{n^u_R + (n^o_R - v_{RL} - v_{RC} - v_{RR}) + v_{LR} + v_{RR}}{n} \right) W^R_L - M_L. \tag{2.2}
\]
where $M_j$ represents the amount of rents (income) transferred by party $j$ to other agents in the economy so that neither party is liquidity constrained. Clearly, $M_L = p_L^L v_{LL} + p_L^R v_{RL}$.

We now describe the timing of the game.

- The political ‘market for votes’ opens, with parties non-cooperatively announcing a price at which they will purchase votes from each type of rural agent.
- Agents then sell votes to the political parties.
- Voting takes place.
- Political parties then observe voting behavior. Rents are distributed by the political parties, government formation and consumption takes place.

2.1. Equilibrium Direct Vote Buying

We solve for the subgame perfect equilibria of this game. The nature of the equilibrium depends on the values of $W_k^L$ and there are potentially several cases to consider. To simplify the discussion, we focus in what follows on the situation in which the centrist party values votes less than the two other parties. In particular, we assume that $W_L^L - W_L^R > \max(W_C^C - W_C^k)$ and, similarly, $W_R^R - W_R^L > \max(W_C^C - W_C^k)$, so that either the left or the right-wing party always finds it profitable to outbid any price announced for a vote by the center party. Using equations (2.1) and (2.2), the marginal benefit for the left wing party from buying a vote that would otherwise be bought by the right-wing party, $\Delta W_L$, can be written as:

$$\Delta W_L = \frac{1}{n} \left( W_L^L - W_L^R \right).$$

Similarly, we define $\Delta W_R = \frac{1}{n} \left( W_R^R - W_R^L \right)$. In this sub-section we consider the equilibria where the parties buy votes directly from the individuals. To simplify the discussion, we first assume that the ideological bias of the voters is low enough, so that the equilibrium prices are always positive: $\Delta W_R > \sigma$ and $\Delta W_L > \sigma$. This
assumption implies however that, in equilibrium, all rural votes are bought. We shall come back to this assumption in the next subsection.

2.1.1. Case 1: $\Delta W_L + \sigma \geq \Delta W_R \geq \Delta W_L$

In this case, the right-wing party still values votes (weakly) more than the left-wing party, but not sufficiently to compensate left-wing people for voting right. In this case there is a unique equilibrium which has the following form

$$\begin{align*}
\text{Party } R \text{ offers } & \begin{cases} 
p_R^R = \Delta W_L - \sigma \\
p_R^L = \Delta W_R 
\end{cases} \\
\text{and,} & \\
\text{Party } L \text{ offers } & \begin{cases} 
p_L^R = \Delta W_L \\
p_L^L = \Delta W_R - \sigma 
\end{cases}
\end{align*}$$

(2.3)

In this case, the fact that vote buying takes place does not alter the outcome of the election - left-wing people vote left and right-wing people vote right. To break ties, we assume that if indifferent between offers, an individual accepts the offer of the party he prefers from an ideological standpoint.

The equilibrium is similar to a Bertrand Equilibrium. Even though all votes can be bought, because both parties have relatively similar valuations of the votes, in the unique equilibrium there is no effect of the market for votes on the outcome of the electorate. To see the intuition for these prices note that to get the most the left wing party would be willing to pay for the vote of a right-wing agent is $\Delta W_L$. The right-wing party however can get such an individual to vote for him by offering a price $\Delta W_L - \sigma$, since such a person intrinsically prefers to vote for the right-wing party.

To see that this is an equilibrium note that if $p_L^R = \Delta W_L$ and the right-wing party were to offer $p_R^R = \Delta W_L - \sigma - \varepsilon$ for $\varepsilon > 0$ then all right-wing people in the agricultural sector would vote left. This would result in a fall in the payoff to the right-wing party of $n_R^a \Delta W_R$. If the right-wing party had bought the votes at the price of $\Delta W_L - \sigma$ this would have cost $(\Delta W_L - \sigma) n_R^a$ which since $\sigma > 0$ is clearly better even in the case where $\Delta W_R = \Delta W_L$. Since offering a price $p_R^R = \Delta W_L - \sigma$ secures all the right-wing votes for the right-wing party offering a higher price is
not optimal. For the left-wing party, offering $\Delta W_L + \varepsilon$ for a right-wing vote is not optimal. Even though this would allow it to out-compete the right-party they have to pay more for the votes than they are worth, hence such a deviation lowers their payoff. Finally, if they offer $\Delta W_L - \varepsilon$ they fail to buy any right-wing votes so that their payoff is unchanged. Hence $p^R_L = \Delta W_L$ is weakly optimal. Similar types of arguments suffice to derive the other prices. Hence the above prices constitute an equilibrium. Neither party can deviate and increase their payoff.

2.1.2. Case 2: $\Delta W_R > \Delta W_L + \sigma$

In this case the right-wing party values the votes sufficiently more than the left-wing party that it will find it optimal to buy the votes of left-wing people, even if it has to compensate them for the disutility of voting right. There is therefore a unique equilibrium of the following form.

\[
\begin{align*}
\text{Party } R \text{ offers} & \quad \left\{ \begin{array}{l} 
 p^R_R = \Delta W_L - \sigma \\
 p^L_R = \Delta W_L + \sigma + \varepsilon
\end{array} \right. \\
\text{Party } L \text{ offers} & \quad p^L_L = p^R_L = \Delta W_L
\end{align*}
\]

where $\varepsilon > 0$ and small, and,

\[
\begin{align*}
\text{Party } L \text{ offers} & \quad p^L_L = p^R_L = \Delta W_L
\end{align*}
\]

and the result is that $R$ buys all the votes in equilibrium.

Clearly, both Cases 1 and 2 have symmetric cases where $\Delta W_L > \Delta W_R + \sigma$ and $\Delta W_R + \sigma \geq \Delta W_L \geq \Delta W_R$. However, the nature of equilibrium in these cases follows in a straightforward way from the above analysis and since these cases are not central to the empirical analysis of the paper we do not write them out here.

2.2. Equilibrium Indirect Vote Buying

We now consider the equilibrium in the market for votes in the case where some people sell the votes of others. Later in the paper we provide a microfoundation for this by modelling the employment relation, but for now we simply take the existence of this ‘control’ for given and study how it impacts equilibrium in the vote market. We assume that if one agent sells the vote of another then they
may sell the vote of this person to whichever party they wish and their only aim is to maximize their income. Since votes can only be bought and sold in the agricultural sector, we allow for indirect vote buying in this sector only.

Though there are quite a few potential cases to consider in general, we focus on a situation where the votes of some of the left-wing agents are sold by some of the right-wing agents. The notation we use for this is as follows, since we will subsequently associate being controlled with being employed, we use the notation \( w \) (‘worker’) to denote a left-wing agent whose vote is controlled. There are \( n^a_L(w) \) such agents, and letting \( n^a_L(f) \) be the number of uncontrolled left-wing agents (‘free’) we have \( n^a_L(w) + n^a_L(f) = n^a_L \), the total number of left-wing agents in the agricultural sector. With respect to right-wing agents, we let \( n^a_R(f) \) denote the number of free ones, who are neither controlled nor who control others, and \( n^a_R(\ell) \) (‘landlord’) denote right-wing agents who control the votes of others. Here, \( n^a_R(f) + n^a_R(\ell) = n^a_R \). Since the votes of left-wing agents are controlled by right-wing agents we assume that ties with respect to the vote of the controlled agent are broken in favor of the ideological orientation of the right-wing agent.

The political parties can now offer prices to free agents for their votes, to agents who control the votes of others for their own vote, or to such agents for the votes they control. There will now be six equilibrium prices rather than four and these will differ depending on the part of the parameter space we are considering. We use the following notation for these six prices, let \( p^j_k(x) \) be the price offered by party \( j = L, R \) to a voter of ideological type \( k = L, R \) and status \( x = f, w, \ell \).

We can now re-work the analysis of the above two cases.

2.2.1. Case 1a: \( \Delta W_L + \sigma \geq \Delta W_R \geq \Delta W_L \)

In this case there is a unique equilibrium of the following form.

\[
\begin{align*}
\text{Party } R \text{ offers} & \quad \begin{cases} 
p^R_R(\ell) = p^R_R(f) = \Delta W_L - \sigma \\
p^L_R(w) = \Delta W_L \\
p^R_R(f) = \Delta W_R 
\end{cases} \\
\text{and,} & \\
\text{Party } L \text{ offers} & \quad \begin{cases} 
p^R_L(\ell) = p^R_L(f) = p^L_L(w) = \Delta W_L \\
p^R_L(f) = \Delta W_R - \sigma
\end{cases}
\end{align*}
\]
The nature of equilibrium here has two very interesting implications. First, note that in Case 1, where there was no vote controlling, if the right-wing party had wished to purchase the vote of a left-wing agent it has to pay $\Delta W_L + \sigma$. However, when there is vote controlling, it only has to pay $\Delta W_L$. Since the left-wing party is offering $\Delta W_L$ for the vote of a controlled person, the right-wing party only has to match this price and the right-wing agent who controls the vote is willing to supply the vote. Hence, it is cheaper for the right-wing party to buy votes indirectly from others.

Second, when $\Delta W_L + \sigma \geq \Delta W_R \geq \Delta W_L$ it is never optimal for the right-wing party to buy left-wing votes at a price of $\Delta W_L + \sigma$ because they are too expensive relative to their value. The outcome of this is that the possibility to buy votes directly does not change the outcome of the election. However, when, because of vote controlling, votes can be bought indirectly at a lower price than before, and since $\Delta W_R \geq \Delta W_L$ the right-wing party does find it optimal to buy the votes of those controlled and the outcome of the election shifts in favor of the right, the $n^L_R(w)$ who voted left in Case 1 now vote right. This case shows that even in circumstances when there is a market for votes, whether or not vote buying is direct or indirect is very important for the political equilibrium.

Note finally that all of these results would hold a fortiori if we allowed right-wing landlords to get utility from the fact that they force/induce left-wing agents to vote right.

2.2.2. Case 2a: $\Delta W_R > \Delta W_L + \sigma$

In this case, as we saw above, the right-wing party values the votes sufficiently more than the left-wing party that it will find it optimal to buy the votes of left-wing people, even if it has to compensate them for the disutility of voting right. Nevertheless, the introduction of vote controlling again reduces the price of votes that the right-wing party has to pay.

There is now a unique equilibrium of the following form.

\[
\begin{align*}
\text{Party } R \text{ offers } & \\
\quad p^R_R(\ell) = p^R_R(f) = \Delta W_L - \sigma \\
\quad p^L_R(w) = \Delta W_L \\
\quad p^L_R(f) = \Delta W_L + \sigma + \varepsilon, \\
\end{align*}
\]
where $\varepsilon > 0$ and small, and,

\[
\text{Party } L \text{ offers } \quad p^R_L(\ell) = p^R_L(f) = p^L_L(w) = p^L_L(f) = \Delta W_L.
\]

The result is that $R$ buys all the votes in equilibrium.

This case has a similar implication to Case 2 for the outcome of the election. The main difference is that the possibility of indirect vote buying allows the right-wing party to buy the votes of left-wing agents that are controlled at a lower price. However, as in Case 2, the right-wing party values votes so highly that it outbids the left-wing party even for uncontrolled left-wing agents.

### 2.2.3. The ideological bias and the impact of indirect vote buying

Let’s now briefly consider the situations that arise when the value of his own vote for a voter is larger than for the party: $\Delta W_R \leq \sigma$ and $\Delta W_L \leq \sigma$. Note first that under these conditions, $\Delta W_R > \Delta W_L + \sigma$ never holds, so that we restrict our attention to the case where $\Delta W_L + \sigma \geq \Delta W_R \geq \Delta W_L$. Under direct vote-buying, the equilibrium prices announced by the parties become:

\[
\begin{align*}
\text{Party } R & \text{ offers } \begin{cases} 
 p^R_R = 0 \\
 p^L_R = \Delta W_R
\end{cases}, \quad \text{and} \quad \text{Party } L \text{ offers } \begin{cases} 
 p^R_L = \Delta W_L \\
 p^L_L = 0
\end{cases} \tag{2.7}
\end{align*}
\]

so that, in equilibrium, right-wing voters vote right, and left-wing voters vote left, but they receive nothing in exchange for their votes (i.e., the price paid to each voter is nil). The price offered by the competing party is never sufficient to induce voters to change their votes, and the market for votes is empty.

Under indirect vote buying, the equilibrium prices become:

\[
\begin{align*}
\text{Party } R & \text{ offers } \begin{cases} 
 p^R_R(\ell) = p^R_R(f) = 0 \\
 p^L_R(w) = \Delta W_L \\
 p^L_R(f) = \Delta W_R
\end{cases}, \quad \text{and} \quad \text{Party } L \text{ offers } \begin{cases} 
 p^R_L(\ell) = p^R_L(f) = p^L_L(w) = \Delta W_L \\
 p^L_L(f) = 0
\end{cases} \tag{2.8}
\end{align*}
\]

The equilibrium is markedly different, since the controlled votes are now bought from the landlord by the right-wing party. The existence of votes control therefore creates the conditions for the emergence of a market for votes, and for the existence of electoral corruption. This directly follows from the fact that vote control makes it cheaper for the parties to buy the votes of those who are controlled.
2.3. Main Results

We can sum up the important conclusions of this analysis with the following propositions. The first one refers to the situation with direct vote buying, while the second two consider both direct and indirect vote buying.

**Proposition 1:** If $|\Delta W_L - \Delta W_R| \leq \sigma$, so that no party values votes sufficiently more than another, then the existence of direct vote buying does not influence the outcome of the election.

An immediate implication of Proposition 1 is that if either party does value votes much more than another, i.e. if $\Delta W_R > \Delta W_L + \sigma$, or $\Delta W_L > \Delta W_R + \sigma$, then vote buying does change the outcome of elections, with either the right-wing party buying all the left-wing votes or vice versa.

Cases 1a and 2a demonstrate the following important result.

**Proposition 2:** It is cheaper for the right-wing party to buy votes from a landlord than to buy votes directly from individuals.

Proposition 2 has the implication that the introduction of indirect vote buying into a situation where previously there was just direct vote buying can change the political equilibrium. Because it is cheaper for parties to buy votes indirectly, this can lead to changes in who buys votes and thus the outcomes of elections. Proposition 2 also has the implication that it will never be profitable for a rural agent to become a political entrepreneur, buying votes from individuals and then selling them to parties.

**Proposition 3:** If $|\Delta W_L - \Delta W_R| \leq \sigma$, so that no party values votes sufficiently more than another, then the existence of indirect vote buying in addition to direct vote buying does influence the outcome of the election.

Interestingly, it is precisely the same circumstances that direct vote buying did not alter the outcome of the political equilibrium, that indirect buying does. By contrast, if $\Delta W_R > \Delta W_L + \sigma$, so that the difference between the valuation of votes
is sufficiently large, then indirect vote buying in addition to direct vote buying, does not change the outcome of the political equilibrium. It is worth re-emphasizing the impact of indirect vote buying when the ideological bias of the voters is large. Indeed, when the ideological bias is large, vote control and indirect vote buying create the necessary conditions for the existence of electoral corruption:

**Proposition 4:** When the ideological bias is large, \( \sigma > \Delta W_k \), no votes are bought under direct vote buying. Indirect vote buying creates a market for the controlled votes, and does change the outcome of the elections.

Finally we consider the social efficiency of these different equilibrium outcomes. As we mentioned in the introduction, a tradition in economics dating back to Buchanan and Tullock (1962) argues that what we call vote buying must promote efficiency because it takes advantage of gains from trade. This intuition is true in our model. When political parties only buy votes directly from individuals, an exchange only takes place when the party values the vote more than the individual selling it. This must make both better off. However, this argument has to be modified when we allow for vote controlling.

**Proposition 5:** While direct vote buying is socially efficient, indirect vote buying is socially inefficient in exactly the circumstances where it influences the outcome of the election.

Proposition 5 has severely negative implications for the idea that being able to freely buy and sell votes promotes efficiency. In the absence of a secret ballot we would expect indirect vote buying to quickly emerge, as is consistent with the historical and case study literature, and in this case there can be no presumption that ‘political exchanges’ promote social welfare.

### 2.4. Electoral Reform

We now consider the comparative statics of the equilibria derived above with respect to changes in political institutions. The most interesting such exercise is to consider the implications of the introduction of a secret ballot which stops
both vote buying and vote controlling. This happens because contracts between a political party and a person who is selling his vote can only be enforceable when voting is observed. If there is a secret ballot nothing stops an individual promising to vote for the party that offers him a higher price and then voting for the party of his choice. This means that a political party can never buy the vote of someone who intrinsically prefers the other party. Hence the market for votes collapses. The implications of this are summed up in the following result.

**Proposition 6:** If there is only direct vote buying and \(|\Delta W_L - \Delta W_R| > \sigma\), or if there is direct and indirect vote buying and \(|\Delta W_L - \Delta W_R| \leq \sigma\), then electoral reform which closes the market for votes changes the outcome of the political equilibrium.

Without vote controlling, when one of the parties values votes much more than the other, they buy up the votes of all individuals. Introducing an effective secret ballot in this circumstances stops vote buying and selling and has a large impact on the political equilibrium.

The results of this section showed that the possibility of buying votes indirectly from those who control them has important effects on the political equilibrium. The reason for this is that those who control votes only care about the price they can get for them, not the ideological orientation of those who are controlled. But why? How is it that someone, such as an employer, can control the political behavior of his employee without having to compensate him for the disutility of voting against his will? To answer this question we need to provide some microfoundations for voter control and we now turn to this issue.\(^{15}\)

\(^{15}\)We will also see that once we introduce some microfoundations for voter control, Proposition 5 will have to be amended. For example, even while in this part of the parameter space introducing vote controlling when vote buying exists may not change the political equilibrium and the outcome of the election, it can influence the economic equilibrium of the model. In consequence though electoral reform may not change outcome of the election, it can influence the economy.
3. Employment and Power

We now develop a model of vote controlling.

3.1. Fundamentals

As in the analysis so far, we focus on the agricultural sector. In this sector there are $L$ units of land which are owned by landowners. We assume that right-wing agents are landowners with each owning $L/n_R^2 = l$ units of land. Left-wing agents own no land and no agents have access to the capital market. All rural agents have the option to be self-employed and earn an income of $w$.

There is a single numeraire consumption good which is produced from land and labor. The technology is characterized by a standard constant returns to scale neoclassical production function. On any farm, the expected output of a worker is equal to $\tilde{\theta} g \left( \frac{L}{n} \right)$ where $n$ is employment, $g$ is the intensive form of the production function so that $g' > 0$ and $g'' < 0$, and $\tilde{\theta}$ is a plot-specific stochastic shock to output which is distributed independently across plots and can take two values, $\theta$ and 0 (by normalization). The probability that $\theta$ occurs depends on the effort exerted by a worker.$^{16}$ Effort, $\varepsilon$, takes two values, $\varepsilon \in \{0, e\}$. If $\varepsilon = e$, $\theta$ occurs with probability $\gamma^h$, while if $\varepsilon = 0$, $\theta$ occurs with probability $\gamma^l < \gamma^h$. Expected output on a farm of size $l$ with $n$ workers is therefore $\tilde{\theta} g \left( \frac{L}{n} \right) n$.

While output is perfectly observable by the landlord, the level of effort exerted by the worker is not. This induces a moral hazard problem. We assume that effort can never be observed so that the only possible wage contract depends on the realization of $\tilde{\theta}$.

We now adapt the utility functions of the previous section to the present model. All agents in the agricultural sector have utility functions which are linear in consumption, $x$, effort, $\varepsilon$, and ideological utility, $\sigma$. Thus utility is $x - \varepsilon + \delta_j \sigma$ for $j = L, R$ and as before $\delta_j \in \{0, 1\}$ is an indicator variable such that $\delta_j = 1$ if an agent of type $j$ votes for the party he prefers and $\delta_j = 0$ otherwise.$^{17}$

$^{16}$We use a variant of a model which has become standard in the development literature, see for example section 3 of Bardhan et al. (1998) and Banerjee, Gertler and Ghatak (2002).

$^{17}$Alternatively, one may think of $\sigma_j$ as the marginal impact of one’s vote on the probability
Finally, the political fundamentals of the model are as before, and since the possibility of vote controlling will be present, we use the notation $p^k_j(x)$ for the price offered by party $j$ to different agents.

We now describe the timing of the game.

- The political ‘market for votes’ opens, with parties non-cooperatively announcing a price at which they will purchase votes from each type of rural agent.
- The land market opens with each landlord deciding how much land to buy.
- Landowners then hire workers by proposing a contract which depends on the state of nature and the worker’s voting behavior.
- Agents then sell votes to the political parties.
- Workers choose their effort level. Voting and production take place.
- Landlords and the political parties then observe voting behavior and the state of nature. Rents are distributed by the political parties, wages are paid and consumption takes place.

We solve for the subgame perfect equilibrium of this game. We start by describing the optimal labor-voting contract.

### 3.2. The Labor-Voting Contract

As is standard, we endow the landlord with all the bargaining power with respect to workers and he can therefore make take-it-or-leave-it contract offers to his worker(s) specifying their expected voting behavior and effort level. As there are two dimensions to the worker’s behavior, there are four possible wages, corresponding to whether output is high or zero, and whether the worker is observed voting for the specified party or not. However, to ensure maximal incentives, a landlord will optimally propose only two wages: a high wage, $w^h$, if output is that his own preferred party wins the election, times the utility he derives from this.
high and the worker is not observed voting for the wrong party, and a low wage, \( w^l \), otherwise. The state dependent wage rates proposed, \( w^h \) and \( w^l \), must be sufficiently different that the worker has the incentive to simultaneously exert the desired level of effort and vote appropriately.\(^{18}\)

We focus here on the situation under which a worker is required by his landlord to vote for the right-wing party. (The conditions under which a worker is required to vote for the left-wing party are less stringent, and are therefore omitted here.) Given his voting behavior, the worker will exert the optimal amount of effort if the following incentive compatibility condition is satisfied:

\[
\gamma^h w^h + (1 - \gamma^h) w^l - e \geq \gamma^l w^h + (1 - \gamma^l) w^l.
\]

Equation (3.1) has a standard interpretation. The left side is the expected utility of exerting effort given the probability of the high wage, \( \gamma^h \), induced by exerting effort. The right side is the expected utility when \( \varepsilon = 0 \).

A worker must also be induced to vote the way the landlord wants him to. In particular, the worker should not find it optimal to shirk on votes and effort simultaneously, which implies,

\[
\gamma^h w^h + (1 - \gamma^h) w^l - e \geq w^l + \max\{p_R^L(f), p_L^L(f) + \sigma\}.
\]

where the right side of the inequality takes into account that the worker now sells his vote to the political party he chooses since he is a ‘free’ agent in the political market. Even though a self-employed person has an ideological preference for voting for the left-wing party, he may prefer to sell his vote to the right-wing party if it offers him a price for his vote which is sufficiently greater than the price offered by the left-wing party. In this case he gets a utility benefit of \( \max\{p_R^L(f), p_L^L(f) + \sigma\} \), but is penalized with the low wage \( w^l \). Notice that it can never be optimal for a worker to exert effort and deviate from the voting behavior stipulated in the contract - since voting is observed, if the worker is going to vote as he wishes it is surely optimal to shirk as well since the worker will receive the low wage.

\(^{18}\)We do not here attempt to develop a model of all the idiosyncrasies of the labor contracts which were offered to inquilinos, on which see Sadoulet (1992).
We assume that a worker’s liability is limited, so that \( w^l \geq 0 \). In an optimal contract the landlord offers \( w^l = 0 \). Consider a situation in which the optimal wage is chosen so that condition (3.1) is satisfied with equality, that is

\[
\gamma^h = \frac{e}{\gamma^h - \gamma^l}
\]  

(3.3)

Note that, \( \gamma^e = \gamma^h - w \) is the rent which must be conceded to the worker to induce effort and results from the unobservability of effort. We now assume that it is always profitable for the landlord to pay this efficiency wage contract, \( (w^h, 0) \).

We therefore assume that the expected increase in profit from workers exerting effort must be greater than the expected increase in the wage bill, this implies that the following inequality holds \( (\gamma^h - \gamma^l) \theta g \left( \frac{1}{n} \right) \geq \frac{\gamma^h e}{\gamma^h - \gamma^l} - w \).

Finally, we also require that the wages offered in the contract satisfy a participation constraint, that is:

\[
\gamma^h w^h - e \geq w + \max\{p^R(f), p^L(f) + \sigma\}.
\]  

(3.4)

The left side of (3.4) is the expected utility from exerting effort and voting against ones preference. For a contract to be acceptable, this must be at least as great as the expected utility from not having a contract which is the outside wage \( w \) plus the expected utility from selling ones vote as one wishes \( \max\{p^R(f), p^L(f) + \sigma\} \).

Note that, in this case, if the participation constraint (3.4) is satisfied, then (3.2) is also satisfied.

We assume that even at the maximum prices political parties are prepared to offer, the agent prefers working for the landlord than being self-employed and voting freely. We therefore assume:

**Assumption 1:** \( \frac{\gamma^e}{\gamma^h - \gamma^l} - w \geq \max\{p^R(f), p^L(f) + \sigma\} \).

Hence the following proposition.

**Proposition 7:** If Assumption 1 holds then the participation constraint is satisfied, and it is costless for the landlord to control the political behavior of his workers.

25
Intuitively, the simple fact that the labor market is plagued by moral hazard problems implies that the landlord must concede rents to his workers. This occurs even though he is in a position to make take-it or leave-it offers to the latter. However, the threat to the worker of losing those rents reduces the amount the landlord must give them to compensate for voting against their will.\footnote{The surplus thus given to the workers also yields a comparative advantage to the employer in other spheres, such as the credit market. This argument has been used in part of the literature on interlinked contracts.} Proposition 7 provides a microfoundation for our assumptions about vote controlling in sector 2. On its own it is interesting, in addition, as we show in the next section, once we consider how vote controlling influences the economic equilibrium of the model we will see that Proposition 7 generates some empirically testable implications.

More specifically, under Assumption 1, and given the specification of the contract, a landlord pays $w^h$ if $\theta$ is observed and the worker is not found cheating with respect to voting. Otherwise, the landlord pays 0. By construction such behavior induces workers to exert effort and vote as specified by the landlord in the relevant range of prices that can be offered by the parties for the votes. In the following, we let denote $\bar{\theta}$ the expected productivity of a plot of land if a worker provides effort level $\epsilon$, and use $\bar{w}$ to denote the expected wage paid to a worker who does not shirk: $\bar{\theta} = \gamma^h \theta$, and $\bar{w} = \gamma^h w^h$.

To keep the discussion simple, in the following we assume that Assumption 1 is always satisfied. Note that, even if Assumption 1 is not satisfied, the main results of the paper go through. Indeed, as long as the effort premium is positive, the increase in wage rate necessary to elicit the appropriate voting behavior is lower than the utility of being able to vote freely and sell one’s vote, and landlords still enjoy a comparative advantage in controlling their workers’ votes. When Assumption 1 does not hold and the wage is increased above $w^h$ to induce the worker to vote as specified as well as to exert effort, the model has additional empirical implications.
4. Vote Buying and Resource Allocation

The political parties engage in Bertrand competition. There are several different cases that one can consider, depending on the relative valuations of the political parties for votes and the size of the ideological bias. The main difference here is that before we allowed for the presence of right-wing agents who were uncontrollable. There are now no such agents so that the prices $p_R^R(f)$ and $p_L^R(f)$ will be irrelevant. Note also that, in each case, $p_R^L(w) = \Delta W_L$. Therefore the price paid to a controlled left-wing worker for his vote is the same in all cases. This means that both cases have the same economic implications, though as we discussed above they have different political implications.

We now consider how the presence of vote buying influences market clearing. To understand how this works we first consider the optimal demand for labor in a farm of size $l$ with $n$ workers. Profits are,

$$\gamma^h \theta g \left( \frac{l}{n} \right) n - \gamma^h w^h n + \Delta W_L n$$  \hspace{1cm} (4.1)

The first term in (4.1) is expected revenues, the second the expected wage bill, and the third the political rents that the landlord gets from selling the votes of his $n$ workers at the price $\Delta W_L$. The optimal demand for labor is determined by the first-order condition,

$$\gamma^h \theta \left( g \left( \frac{l}{n} \right) - g' \left( \frac{l}{n} \right) \frac{l}{n} \right) - \gamma^h w^h + \Delta W_L = 0$$  \hspace{1cm} (4.2)

The equation (4.2) implicitly defines the optimal demand for labor as a function of parameters, which we write $n(l, \Delta W_L, w^h)$. The equilibrium price of a plot of land must now adjust so that profits are zero or,

$$\left( \gamma^h \theta g \left( \frac{l}{n(l, \Delta W_L, w^h)} \right) - \gamma^h w^h + \Delta W_L \right) \frac{n(l, \Delta W_L, w^h)}{l} = \pi$$  \hspace{1cm} (4.3)

Equation (4.3) implies the following result.

**Proposition 8:** In equilibrium the price of land incorporates political rents.
It follows from Proposition 8 that a political reform with removes electoral corruption, such as the introduction of an effective secret ballot, removes the ability of landlords to sell the votes of their workers and has interesting comparative static effects. Since we already discussed the political comparative statics, we here simply state the economic comparative statics.

**Proposition 9:** The introduction of a secret ballot leads to a fall in the price of land and, if the right-wing party values votes more than the left-wing party ($\Delta W_R \geq \Delta W_L$), to a fall in the vote share of the right-wing party.

To see these results, note that political reforms remove the price of votes from (4.2) and (4.3). The fact that there is always a fall in the share of the right-wing vote follows from Propositions 3 and 4. The introduction of a secret ballot stops both types of vote buying and therefore, conditional on the right-wing party valuing the votes more than the left-wing party ($\Delta W_R \geq \Delta W_L$), the vote share of the right-wing party will always fall when a secret ballot is introduced.

Thanks to the rents they concede to their workers, it is less costly for landowners to control the political behavior of workers than it is for the political parties. As a result, parties are ready to transfers rents to landowners in exchange for the votes they control. Acquiring land is thus desirable not only for productive purposes, but also for the political rents attached to the political control of the workforce employed on it. Equilibrium prices on the land market reflect this mechanism.

We are now in a position to discuss some of the assumptions made in the paper. First, note that when Assumption 1 does not hold, the optimal labor-vote contract involves a wage higher than $w^h$. Although $w^h$ gives a worker sufficient rents that they do not wish to shirk, it does not give them enough to also control their voting behavior. To achieve this the landlord must raise the wage further. Thus in this situation, political reforms which stop vote buying will lead the wage rate to fall to $w^h$.

If all agents had access to capital markets then there would be no land concentration and all land would be farmed by smallholders with no workers getting rents. To see this note that the price a self-employed agent is willing to pay for
a plot of land, denoted \( \pi_s \), is equal to \( \bar{\theta}g(1) - w - e \). The price that a landlord would be willing to pay, \( \pi_L \), \( \left( \bar{\theta}g \left( \frac{L}{n(l, \Delta W_L, w_h)} \right) - \bar{w} + \Delta W_L \right) \frac{1}{n(l, \Delta W_L, w_h)} \). We now show that \( \pi_s > \pi_L \). Observe first that the participation constraint (3.4) implies, \( \bar{w} - e \geq w + p^L_R(f) \). Moreover, from section 2, in equilibrium \( p^L_R(f) \geq p^L_R(w) \). Therefore,

\[
\bar{\theta}g(1) + \bar{w} - e \geq \bar{\theta}g(1) + w + p^L_R(w),
\]

which can be re-written as,

\[
\pi_s \equiv \bar{\theta}g(1) - w - e \geq \bar{\theta}g(1) - \bar{w} + p^L_R(w) \equiv \pi_L.
\]

Then, since it follows that \( \pi_s > \pi_L \). The fact that, with perfect capital markets, smallholders are always willing to outbid landowners for land follows from the fact that, through the participation constraint, the economic rents that landlords transfer to workers exceed the political rents they receive from parties. Therefore, even though it is still true that the ability of landlords to sell votes increases their demand for land, land is still more valuable to smallholders. \(^{20}\)

The interaction of the market failures is crucial. Without moral hazard there are no rents and even with imperfect capital markets electoral corruption would not affect the price of land, as workers would then have to be fully compensated for the control of their votes. At the same time, with moral hazard but no capital market imperfections there is no inefficiency either. \(^{21}\)

5. A Study of Land and Power: Chile

5.1. The political impact of the 1958 electoral reform: an overview

5.1.1. Political Reforms and Democracy in Chile

Like most Latin American countries, upon gaining independence from Spain, Chile adopted republican institutions. These became institutionalized in the 19th cen-


\(^{21}\)Many researchers have attempted to explain the robust empirical finding that farm size and productivity are inversely related (for example Berry and Cline, 1979, Binswanger, Deininger and Feder, 1995, and Basu, 1990).
tury and elections determined presidential succession without military or other intervention. Nevertheless, like all other nascent democracies in the nineteenth century, the franchise was restricted by wealth and literacy restrictions. Moreover, voting was not secret. Gradually however, political reform took place as the political system attempted to adjust to socio-economic changes unleashed by the evolution of the state and the economy, for example the rise of the mining and agricultural export economies.

A significant watershed in this process were the electoral reforms of 1874. The standard interpretation of these by scholars is an attempt by traditional elites to control the growing autonomous power of the state and urban groups. The leading expert on the history of Chilean democracy, J. Samuel Valenzuela (1996), argues that the 1874 suffrage extension in Chile was opposed by more progressive Chileans who “resisted attempts to expand suffrage ... they fully realized that in a predominantly rural society with traditional landlord-peasant ties, the Conservatives would overwhelm their opponents at the polls.” Bauer (1995, p. 30) presents a similar analysis of these events “... the aristocratic fronde, dominated by the great landowners...(in 1874) helped push through a Law of Electoral Reform that permitted universal literate male suffrage ... Chilean landowners supported the reform not because of an enlightened faith in the civic qualities of the lower classes but as a measured way of counteracting the executive’s disconcerting autonomy in a democratic political system they supported in principle, used when possible, and tenaciously endeavored to restrict and control.”

The controlled democracy which had formed in the nineteenth century collapsed in 1924 and the following period saw five military coups before democracy was fully restored in 1932. The intervening period was dominated by Colonel Carlos Ibáñez. After 1932 democratic stability was based on an explicit compromise between the growing power of urban groups and the power of the traditional landed elites. As Arturo Valenzuela (1978, p. 26) puts it “underlying this state of affairs was a tacit agreement between rural and urban elites. Rural elites were willing to endure the hardship of price controls on agricultural goods imposed by an industrially orientated middle class which relied ... on support from parties of the left with similar interests. In turn, centrist and leftist parties did not alter the
basic political and social structure of the landed elite.”

5.1.2. Mechanisms of Control of Rural Votes

"Throughout the history of the Republic, the political influence of the rural sector in Chile was disproportionately greater than its size relative to the urban sector. Congressional representation was heavily weighted in favor of rural districts where the peasantry historically formed a pliable and controllable mass base for conservative and reactionary groups." (Hellinger, 1978, p. 272). In line with our model, the control of rural votes by landlords was made possible by the relatively good working conditions of the *inquilinos* compared to the possible alternatives: “landowners over and over expressed the need to root their workers to the estate through the offer of land and perquisites ... any tenant family seeking an independent rural existence faced bleak possibilities” (Bauer, 1995, p. 27). "*Inquilinos* are a privileged sector within the peasantry.... which places (him) in a highly dependent position which can be easily exploited by the landlord, whose arsenal of rewards and sanctions is formidable.” (Hellinger, 1978, p.259) “rural people sought positions as *inquilinos* on the estate rather than casting their lot with the desperate and insecure wage earners beyond the gates. They were free ... but they had no defense in the face of expulsion; indeed, the threat of being cast out into the subproletariat of migratory workers was the most powerful weapon at the landowner’s disposal. Most *inquilinos* families undoubtedly judged their welfare on the estate superior to life outside or in the nitrate fields of the northern desert.” (Bauer, 1995, p. 28). The patron-client relationship was very developed (see in particular Bauer, 1995). Thus, “anyone seen visiting the home of a resident laborer would be immediately approached and questioned by the owner, who reserved the right to expel him from the property” (Swift, 1971, p. 37).

Part of the political pact which developed after the 1930’s involved the banning of agricultural unions, a policy which allowed severe labor repression to be carried on in the countryside. For example, in Bauer (1995, p. 32) landowners

are described as “pressuring the state to keep political ‘agitators’ and union organizers out of the countryside”. Dismissal of unionized or protesting workers was frequent, and often backed by the police. Landowners not only systematically dismissed workers participating in ‘subversive’ activities, they also “used violence against the workers, and destruction of crops and homes; blacklisting to prevent future employment was routine ... Despite their own retaliatory measures, landowners frantically insisted on rigorous governmental action to repress the legal unionization of campesinos.” (Loveman, 1976, p. 164). “According to a former minister of interior in the 1940s, Arturo Olavarria: ‘... a group of carabinieros would arrive at a fundo accompanied by a convoy of trucks. When the inquilinos were assembled in the area, the carabinero officer would order those who wished to continue the strike to stand on his left. The officer would then order that the strikers gather their families, cats, dogs, chickens and belongings and get in the trucks to be evicted. ... This tactic I converted into a system ... as the good ones went on the right and the bad ones on the left, as I hoped will occur one day in the valley of Josafat.” (quoted in Loveman, 1976, p. 163).

Landlords systematically controlled rural voting until the late 1950’s. Petras and Zeitlin (1968, p. 510) document that, “until 1958, elections were carried out with each political party having a separate ballot. (...) Thus the patrones often simply gave the ballots for the party of their choice to the inquilinos, and provided them and nearby peasants with transportation to and from the polling places.” Similarly, Bauer (1995, p. 29) argues “The landowners’ political power in the countryside derived from control of land and people; ... as Chile’s formal democracy emerged, landowners had to compete in an electoral game with an ever more autonomous state. This meant that in order to use the state to coerce their workers, they had first to extract from their workers the votes necessary to compete in a restricted but nevertheless formally democratic system.” There is absolute consensus amongst historians, political scientists and sociologists about how this system functioned (for more evidence see in particular Kaufman, 1972, Bauer, 1975, Loveman, 1976, Zeitlin and Ratcliff, 1988 and Scully, 1992, ch. 4).

Particularly important in the detailed study of the presidential election of 1920 by Millar (1981) who describes in detail how this system functioned. “There was an absolute control of peasants by their patrones, and elections in rural communes depended on the political preferences of the landowners. They relied on an electoral clientele formed by the *inquilinos*, peones and small landholders (*pequenos proprietarios*); this last group had...a strong relationship with the latifundistas due to credit, crop trade, lease of money and materials, and personal relations” (Millar, 1981, p. 172). Large landlords usually registered all their employees, by teaching them how to sign their names (as literacy was a condition for vote registration). The day of the election, the employer would go vote with all their employees. “This type of control is pervasive (...). The situation was publicly accepted, and it was even used as an argument in electoral legal complaints, particularly in order to show that any result against the preferences of the latifundistas was fraudulent, or to justify an unanimous electoral result in a rural locality” (Millar, 1981, p. 173).

5.1.3. The political equilibrium in the 1950’s

By the 1950’s the political landscape in Chile was dominated by several main parties. The traditional nineteenth century parties, the Conservatives, Liberals and Radicals were all still effective. The Conservatives and Liberals were furthest to the right and united in most things except in their attitudes to the Church (the Conservatives were closely associated with the Catholic Church while the Liberals tended to be anti-clerical). The Radicals were more towards the center politically and were strongly anti-clerical. Also in the center, though very small in the 1950’s were the Christian Democrats. To the left were the Socialists and then the Communists (the latter were officially banned between 1948 and 1958 though they competed under different names). The landed oligarchy provided the traditional constituency of the two right-wing parties, the Conservative and the Liberal (see, e.g., Gil, 1966). As Sinding (1972, p. 776) notes “The literature ... identifies large landowners and industrialists as Conservatives and Liberals; the urban middle classes and the owners of medium-sized farms as Radicals, and
more recently as Christian Democrats; miners and urban labor-union members as Communists; and the residents of the extreme northern and southern provinces, some intellectuals, and some of the urban poor as Socialists.” The existing party system was shocked however by the return of the former dictator Carlos Ibáñez as a populist presidential candidate in 1952. Ibáñez formed a very heterogenous coalition of mostly leftist groups and capitalized on the general disillusionment with the traditional parties.

5.1.4. The declining practice of vote-buying

At the beginning of the century, direct buying of votes by parties, a system known as the ‘cohecho’, was a major instrument used by political parties to rally urban voters, but it was never systematically used in the countryside, as landlords maintained their control over rural voters. As Heise emphasizes, “In the parliamentary period, the docility of the electorate remained exclusively in the rural areas; it was not necessary to ‘cohechar’ (buy votes) there. The urban voter on the contrary, sells his votes. The buying of votes in the cities became a system in which all political parties were engaged (...) There were even candidates that offered to pay more for votes than any other candidate in printed ads” (Heise, 1982, pp. 228-9). Quoting a prominent newspaper of that period (El Mercurio), Heise points out “The working class was convinced that a congressional or presidential candidate was entitled to pay for votes.” Many voters thought that “when votes are not bought, politicians had stolen the money that the government had sent for the elections” (Heise, 1982, p. 230). That landowners were not directly paid per vote is not totally surprising, as they were benefitting from their political influence in a variety of ways, including social prestige, influence over policies (such as those with respect to the ability of trade unions to organize) and electoral positions for themselves and their relatives. Thus Heise calculates that until the end of the parliamentary period (1925), more than 90% of political leaders are large landowners. By the 1950’s however, direct vote buying by the parties had almost disappeared (see e.g. Scully, 1992, or Sinding, 1972), and, as we shall see, the 1958 electoral reform puts an end to this practice.
5.1.5. Electoral Institutions

We quickly sketch the nature of Chilean electoral institutions in this period (see Gil, 1966, Chapter 5, and Morodo, 1968). The districts for the election of members of the Chamber of Deputies were drawn to coincide with the provincial boundaries in twenty-one of Chile’s twenty-five provinces. Exceptions were the province of Santiago, which had four electoral districts, the province of Nuble, which had two, and the provinces of Llanquihue and Aysen, which together formed one district. From one to eighteen deputies were elected from each district. Senators were elected under a system of constituencies or groups of provinces numbered from north to south – five senators being elected for each of nine senatorial districts. Deputies were elected for four year terms, senators for eight with half of the Senate being replaced every four years. Municipal elections were formerly held every three years, but a constitutional amendment adopted in 1959 stipulated a four-year term of office for councilmen and specified municipal elections to be held two years after congressional elections, in April every four years.

The Constitution of 1925 determined that elections of senators, deputies, and municipal councilmen were to be held using proportional representation. The specific system adopted was the D’Hondt system. Prior to the reforms of 1958, parties issued their own ballot papers and a closed list system was used. After 1958 the voter received a single, official ballot, which contained all party slates for any single type of election in his district and an open list system was adopted so that voters did not have to respect any official ordering of candidates. In case of congressional election he receives a separate ballot for candidacies for the Senate and candidacies for the Chamber of Deputies.

5.1.6. The introduction of the secret ballot in 1958

There were several important electoral reforms undertaken in Chile in the late 1950’s and early 1960’s. The most important was Law 12.889 promulgated on

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24In 1958 the groups electing senators were: I, Tarapaca and Antofagasta; II, Atacama and Coquimbo; III, Aconcagua and Valparaiso; IV, Santiago; V, O’Higgins and Colchagua; VI, Curico, Talca, Maule, and Linares; VII, Nuble, Concepcion, and Arauco; VIII, Bio-bio, Malleco, and Cautin; IX, Valdivia, Llanquihue, Chiloe, Aysen, and Magallanes.
May 31st 1958. This law amended the basic electoral law of 1925 (see Castro, 1941, p. 35 for a discussion of this law and Cruz Coke, 1984, pp. 27-29) and its most important aspect was the introduction of the cédula única (the unified ballot). Under the 1925 law, while ballots had been printed by the government, they had printed separate ones from each party list. Thus to vote for the Socialist party, a voter had to request the Socialist ballot which made it easy to determine his voting behavior. Scully (1992, p. 134) notes that the introduction of the unified ballot “prevented party agents from learning the preferences of the electors in the voting booths.” Another important law of 1958 banned electoral pacts between parties for deputies and councilmen (a 1962 electoral law extended this prohibition to senatorial elections).

As Table 1 below shows, the introduction of the secret ballot had an immediate impact on the balance of political power in Chile. Loveman (1976, p. 219) notes, “The introduction of a public ballot meant that landowners could no longer effectively control the votes of rural labor. The electoral hegemony of the Right in the countryside thus gave way to forces that advocated social change in the rural areas ... In 1958 the performance of the FRAP (Socialists and Communists) in rural districts left little doubt that landowners’ control over rural votes had considerably declined.” In the Central Valley Provinces, “the result was a steady decline of rightist voting strength in these areas (from 54 percent in 1949, to 31 percent in 1961, to 17 percent in 1965) and a steady increase in the number of Marxist voters ... [they] nearly provided the Marxist presidential candidate, Salvador Allende, with a national victory in the presidential elections of 1958. Running again in 1964 against the Christian Democratic candidate, Allende polled an absolute majority (52 percent) of the male voters within these provinces.” (Kaufman, 1972, pp. 28-9).

If the lack of secret balloting had played an important role in guaranteeing democratic stability in Chile since the 1930’s, why was the secret ballot introduced in 1958? Though this issue appears not to have been researched by political scientists, the most plausible reason for this is a deliberate attempt to disrupt the existing political equilibrium. As we noted above, the election of Ibáñez in 1952
was based on a heterogenous coalition and an ‘anti-politics’ platform.\textsuperscript{25} Ibáñez intended to forge a new political movement and though he failed in this, it seems likely that the introduction of the secret ballot with its easily anticipated effects on voting in the countryside, was a calculated gamble. It may also have been part of a deal which he made with some of his key supporters, the Agrarian Labor party (Agrario Laboristas) and the Popular Socialist party (Partido Socialista Popular) both of which would have had an interest in mobilizing rural voters.\textsuperscript{26}

Interestingly however, despite these changes, the Conservative Jorge Alessandri won the presidential election in 1958,\textsuperscript{27} principally on a platform emphasizing conservative monetary policies which were a response to the populism of the Ibáñez regime. Under Ibáñez per-capita GDP had fallen by 2\% and inflation had averaged 45\%, peaking at an annual rate of 76\% in 1955 (see Ffrench-Davis, 1973, p. 242 and Table 35). However, the right began to disintegrate during the 1960’s with the rise of the centrist Christian Democrats (whose candidate Eduardo Frei won the presidency in 1964) and in 1966 the Conservatives and Liberals merged to form the National Party.

As the urban-rural pact fell apart after 1958 so did its institutions. Agricultural unions were legalized in 1967 and started to mobilize in the early 1960’s so that “over two hundred rural unions were organized before the passage of legislation in 1967 allowing the formal establishment of rural unions” (Valenzuela, 1978, p. 29).

\textsuperscript{25}Ibáñez’s strategy is reminiscent of many other anti-political figures in Latin America. Two clear comparisons being Gustavo Rojas Pinilla, Colombian dictator in the 1950’s, who was narrowly beaten in the 1970 presidential election race and the current Venezuelan president Hugo Chavez who previously attempted to orchestrate a coup against a democratically elected government.

\textsuperscript{26}A gamble with grave consequences since in some sense the dramatic shift in the Chilean political equilibrium after 1958 induced a process which converged to the coup in 1973 and sixteen years of military rule.

\textsuperscript{27}Though he polled only 33,416 votes (out of 1,235,552 cast) more than Salvador Allende, the candidate for the Socialist and Communist alliance. Antonio Zamorano, a leftist defrocked priest, deprived Allende of a victory by gaining 41,304 (3.3\%) left-wing votes.
5.1.7. Agrarian relations and electoral results across provinces

We collected data on congressional elections from the 1957, 1961 and 1965 electoral registries (Direccion del Registro Electoral). The data on the agricultural sector were collected through the agricultural census of 1955 and 1965 (III Censo Nacional Agricola Ganadero, and IV Censo Nacional Agropecuario). The data were collected at the *comuna* (municipality) level, which corresponds to the lowest level of electoral district. They however suffer from the fact that the units of observation in the census do not always strictly match the electoral districts, and their definition is not necessarily stable over time. Thus, out of 295 comunas, we had to exclude all those for which we could not be certain of the correspondence, which left us with a sample of 246 comunas. This also explains why we decided not to collect data at the *comuna* level for a long interval of time, as the matching problem turns out to be intractable. The main variables used in the analysis are described in the appendix (see table A1).

We focus on the 1957 parliamentary (all of the congress and half of the senate) elections, as it allows a more direct comparison to the parliamentary elections that occurred after 1958, and in particular the 1961 and 1965 elections, though the patterns highlighted here extend to the other electoral results as well.\(^{28}\) We examine here the main trends at the level of the provinces. We provide in the Appendix a map of Chile, which indicates the location of its 25 provinces, as well as their grouping into 8 main regions.

\(^{28}\)We do not take the 1953 congressional and senatorial elections because they were very exceptional. After the election to the presidency of Carlos Ibañez in 1952, the 1953 elections saw a transient collapse in the right-wing vote in the face of the Ibañista bandwagon. Scully (1992, p. 126) notes “The disruption of familiar patterns of party competition was also reflected in the extreme fragmentation by the party system in the congressional elections of 1953. In that year, 25 party organizations presented candidates, and 19 achieved representation. Party proliferation weakened Chile’s traditional parties. Whereas in the congressional elections of 1949 the Conservative, Liberal, and Radical parties combined received more than 60% of the vote, in 1953 they received barely on third.” This was just a temporary phenomena however. Scully goes on to add (1992, p. 126) “Though Ibañez had put the leadership of traditional parties on the defensive in 1953, the situation was reversed between 1953 and 1957.” Focusing on 1953 therefore has a tendency to underestimate the fall in conservative support after 1958. Moreover the definition of electoral circonscriptions changed through time, which would further restrict our sample.
Table 2 below provides a striking illustration of the relationship between agrarian relations and electoral outcomes, and its evolution after 1958. In the table, we report the information over the three Central Valley regions separately, and for the Central Valley as a whole, its two neighboring regions, the Frontier and the Little North, and the other regions.

Table 2 HERE

Across all Chilean provinces, the relationship between right-wing votes and the patron-inquilino system is striking. Before 1958, the impact of rural patron-client relationships on the electoral results are striking. Provinces in which the inquilino system is more developed also tend to exhibit stronger support for the right-wing parties. The landed oligarchy in Chile dominated the Central Valley provinces, and in particular the provinces of Santiago in the Urban Central Valley, and the four provinces of the North Central Valley (which includes the two provinces of Colchagua and O’Higgins referred to by Senator Martones). Thus, the proportion of inquilinos in the number of registered voters in 1957 is 18.9 percent in the North Central Valley, and 17.2 in the Urban Central Valley, but 11.2 in the Frontier and Little North, and 8.2 in the other provinces. Unsurprisingly, therefore, it is in these Central Valley provinces that the proportion of votes in favor of the two right-wing parties was the strongest. The share of right-wing votes in 1957 in the North Central Valley was 50.0 percent, and 40.8 percent in the Urban Central Valley, much higher than the national average (35.0) or the scores obtained in the other provinces (31.2 percent in the Frontier and the Little North, and 26.6 in the other provinces).

The relationship between right-wing votes in the 1957 elections and land concentration is less clear however. This is due to the fact that in the arid, semi-arid and infertile provinces to the north and to the south of the Central Valley (including the Frontier), land concentration tends also to be high, though it seems there to result from the technological constraints of these provinces and the type of activities undertaken (ranching instead of farming). Thus, out of the 8 provinces with more than 80% share of agricultural area operated by large farms, one finds 2 provinces from the Canals region in the extreme south (Aysen and Magallanes), one province from the Little North (Atacama) and one from the Great North
(Tarapaca) (see the map in the Appendix). We shall return to this question later.

After 1958, the fall in the right-wing votes occurs in provinces with higher initial right-wing votes and provinces with a larger proportion of *inquilinos* per worker (across provinces, the correlation coefficient between the proportion of *inquilinos* in the labor force and the fall in right-wing votes is equal to -0.67). The fall in right-wing votes is dramatic in the oligarchic and the Central Valley provinces. Even the absolute number of right-wing votes fell in those areas, in spite of the increase in registered voters. Therefore, while the right wing parties lost 20.2% of all votes in 1965 compared to 1957 in Chile, the fall is 32.7 in the North Central Valley and 27.5 for the Central Valley as a whole. The fall is very pronounced in some provinces, such as Colchagua (-48.1%) from an absolute majority of 70.2% of the votes in 1957 to barely 22.5% in 1965, and 23.1% in 1969, or Aconcagua (-39.2%). Simultaneously, the rise in Christian-Democrats and left-wing vote is equally dramatic in those provinces, as it increased by 56.8.7% in Colchagua (from 6.6% to 63.4% of the votes), by 63.1% in Aconcagua and by 53.3% in O'Higgins, while it increased by only 39.7% in Chile as a whole.

5.2. The political impact of the 1958 electoral reform: a test

5.2.1. The empirical strategy

The empirical strategy pursued in this paper can be described as following. Before the 1958 reform, the share of right-wing votes should be higher in comunas with more *inquilinos* since their votes are then controlled. However, after the reform, the influence of *inquilinos* on electoral results should disappear, so that the difference in voting patterns across the two types of comunas should disappear. This is exactly what comes out of table 3 below, where we report the electoral results in 1957, 1961 and 1965 for comunas with less *inquilinos* than the median, compared to comunas with more *inquilinos* than the median.

<table>
<thead>
<tr>
<th>Year</th>
<th>Communas with less inquilinos</th>
<th>Communas with more inquilinos</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1961</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Over the period, the fall in right-wing votes in comunas with less inquilinos was -0.170 while it went down by -0.297 in comunas with more inquilinos. The impact of the loss of control over *inquilinos* votes on the fall in right-wing votes can
thus be at first sight estimated to be -0.127. The model below aims to estimate this impact more precisely.

5.2.2. The empirical model

We now present the model that will be tested in the empirical analysis. We let $RV_{i,t}$ represent the number of votes in favour of the right wing party, $V_{i,t}$, the total number of voters, and $V^h_{i,t}$, the total number of voters of type $h$ at time $t$ in communal $i$. Voters can be of three different types: $h = inq$ if the voter is an inquilino, $h = agr$ if the voter is not an inquilino but works in agriculture, and $h = na$ if he is not an agricultural worker. We can then write:

$$RV_{i,t} = (\theta_i + \rho_I t + \tau_t^{inq}) V_{i,t}^{inq} + (\theta_i + \rho_I t + \tau_t^{agr}) V_{i,t}^{agr} + (\theta_i + \rho_I t + \tau_t^{na}) V_{i,t}^{na} + \varepsilon_{i,t} V_{i,t}$$

(5.1)

where $\theta_i$ is a communal specific fixed effect, which represents the time-invariant propensity to vote for the right-wing party in that commune, $\rho_I$ is a provincial level fixed effect at each time period which represents the propensity to vote for the right-wing party in province $I$ at time $t$, and $\tau_t^{h}$ represents the specific propensity for a voter of type $h$ to vote for the right-wing party at time $t$. The error component, $\varepsilon_{i,t}$, satisfies the usual conditions. Rearranging equation (5.1) above, and using the fact that $V_{i,t} = V_{i,t}^{inq} + V_{i,t}^{agr} + V_{i,t}^{na}$, we obtain:

$$RV_{i,t} = (\rho_I t + \tau_t^{na}) V_{i,t} + (\tau_t^{inq} - \tau_t^{na}) V_{i,t}^{inq} + (\tau_t^{agr} - \tau_t^{na}) V_{i,t}^{agr} + (\theta_i + \varepsilon_{i,t}) V_{i,t}.$$

Dividing both sides of the equation by $V_{i,t}$, one gets:

$$\frac{RV_{i,t}}{V_{i,t}} = (\rho_I t + \tau_t^{na}) + (\tau_t^{inq} - \tau_t^{na}) \frac{V_{i,t}^{inq}}{V_{i,t}} + (\tau_t^{agr} - \tau_t^{na}) \frac{V_{i,t}^{agr}}{V_{i,t}} + (\theta_i + \varepsilon_{i,t})$$

(5.2)

that potentially can be directly estimated. However, we have no information on the number of voters per category of occupation, $V^h_{i,t}$. In particular, as discussed above, it is very unlikely that the proportion of registered inquilinos in the voting population is equal to the proportion of inquilinos in the total population in a
particular communa. Moreover, even between 1957 and 1965, the number of registered voters in the population varied.

To address this issue, we assume that, in each communa \(i\), the proportion of inquilinos who are registered to vote at time \(t\) is proportional to the proportion of inquilinos who are registered to vote at time \(t_0\). Letting \(N_{i,t}^{\text{inq}}\) and \(N_{i,t}^{\text{agr}}\) represent the number of inquilinos and the number of other agricultural workers in communa \(i\) at time \(t\), we then have:

\[
\frac{V_{i,t}^{\text{inq}}}{N_{i,t}^{\text{inq}}} = \frac{V_{i,t}}{V_{i,t_0}} \frac{V_{t_0}^{\text{inq}}}{N_{i,t_0}^{\text{inq}}} \Leftrightarrow \frac{V_{i,t}^{\text{inq}}}{N_{i,t}^{\text{inq}}} = \frac{V_{i,t_0}^{\text{inq}}}{V_{i,t_0}} \frac{N_{i,t_0}^{\text{inq}}}{N_{i,t_0}}.
\]

We therefore allow for the variation through time in the proportion of voters in a communa to differ across comunas: \(\frac{V_{i,t}}{V_{i,t_0}}\) is specific to communa \(i\). However, to be able to identify the model, we assume that at time \(t_0\), the probability that an inquilino is registered as an elector is identical across all comunas. This is our major identification restriction. We similarly make that restriction for the other agricultural workers (though our main tests do not require this), so that:

\[
\frac{V_{i,t}^{\text{agr}}}{V_{i,t}} = \frac{V_{t_0}^{\text{agr}}}{N_{t_0}^{\text{agr}}} \frac{N_{i,t_0}^{\text{agr}}}{V_{i,t_0}}.
\]

Using these two expressions in equation (5.2), and rearranging those terms, we obtain:

\[
\frac{RV_{i,t}}{V_{i,t}} = (\rho_{t,t} + \tau_{t}^{na}) + \left(\tau_{t}^{\text{inq}} - \tau_{t}^{na}\right) \frac{V_{i,t}^{\text{inq}}}{N_{i,t_0}^{\text{inq}}} \frac{N_{i,t_0}^{\text{inq}}}{V_{i,t_0}} + \left(\tau_{t}^{\text{agr}} - \tau_{t}^{na}\right) \frac{V_{t_0}^{\text{agr}}}{N_{t_0}^{\text{agr}}} \frac{N_{i,t_0}^{\text{agr}}}{V_{i,t_0}} + (\theta + \varepsilon_{i,t}),
\]

which represents the basic equation to be estimated. For further interpretation, it is convenient to rewrite the latter by introducing explicitly provincial dummies, \(D_I\), (which is equal to 1 if communa \(i\) belongs to province \(I\) and zero otherwise) and time dummies for the three periods considered, 1957, 1961 and 1965. We then have:

\[
\frac{RV_{i,t}}{V_{i,t}} = \sum_I \rho_{I,t} \sum_{61} \frac{D_{I} t_{61}}{D_{I} t_{65}} + \sum_I \rho_{I,t} \sum_{65} \frac{D_{I} t_{65}}{D_{I} t_{65}} + \tau_{t}^{na} \frac{D_{61} t_{61}}{D_{65} t_{65}} + \tau_{t}^{na} \frac{D_{65} t_{65}}{D_{65} t_{65}}.
\]
\[ + \beta_{57} \frac{N_{i,1}^{inq}}{V_{i,t_0}} + \beta_{\Delta 61} \frac{N_{i,1}^{inq}}{V_{i,t_0}} - t_{61} + \beta_{\Delta 65} \frac{N_{i,1}^{inq}}{V_{i,t_0}} - t_{65} \\
+ \gamma_{57} \frac{N_{i,1}^{agr}}{V_{i,t_0}} + \gamma_{\Delta 61} \frac{N_{i,1}^{agr}}{V_{i,t_0}} - t_{61} + \gamma_{\Delta 65} \frac{N_{i,1}^{agr}}{V_{i,t_0}} - t_{65} + (\alpha_i + \varepsilon_{i,t}), \quad (5.4) \]

where \( \alpha_i = \theta_i + \sum I \rho_{I,55} D_I \), represents the (total) communa level fixed effect. The basic test we want to carry out is the following. Before the secret ballot was introduced, \( \beta_{57} > 0 \) and \( \beta_{57} > \gamma_{57} \) so that the right wing party gets more vote in a communa with more inquilinos compared to other voters. The main impact of the electoral reform is that, after 1958, inquilinos can vote freely. We therefore expect \( \beta_{\Delta 61} < 0 \) and \( \beta_{\Delta 65} < 0 \), as the influence of inquilinos on the electoral results of the right-wing party should fall significantly after 1958. Moreover, while we may have \( 0 > \beta_{\Delta 61} \geq \beta_{\Delta 65} \) since it is likely that all political adjustments might not be instantaneous (we refer to this as the persistence effect).

However, by 1965, we expect however that the inquilinos in 1965 vote like the other agricultural workers, so that \( \beta_{57} + \beta_{\Delta 65} = \gamma_{57} + \gamma_{\Delta 65} \). This last expression represents our main empirical test.

### 5.2.3. The basic results

The information we have on inquilinos is only for the two agricultural census years 1955 and 1965. While, clearly, the number of inquilinos in 1955 is a good proxy for the number of inquilinos in 1957, it is harder to make such inference for the 1961 election. As a result, we shall first present our main estimates for the elections of 1957 and 1965 only, using the proportion of inquilinos in 1955 in the number of voters in 1957, and the proportion of inquilinos in 1965 in the number of voters in 1965 (and similarly for the other agricultural workers) as the R.H.S. variables. The results of the panel estimations, with a communa fixed effect, are given in the first three columns of Table 4 below. (The fixed effect technique was chosen because of the correlation between the communa fixed effect and the other explanatory variables.)

INSERT TABLE 4 HERE

Column (2) in the table corresponds exactly to equation (5.4) above. However,
the reasons for incorporating time interacted provincial effects are not entirely clear, as they remove from the change at the communa level the ones occurring on average at the level of the province. We therefore chose to also estimate the above model by imposing homogeneity on the evolution of the votes across provinces (electoral results vary in the same way in all provinces and are therefore picked by the year dummy), so that \( \rho_{t, \Delta 61} = \rho_{t, \Delta 65} = 0, \forall I \). The results of the estimates under this assumption are presented as column (1) in the table, and in the following, we shall refer to the latter as the basic model, the one reported in column (2) allowing us to check the robustness of our results, even when provinces are allowed to follow a specific time trend. Lastly, in column (3), we imposed homogeneity in votes between the other agricultural workers and the other voters in the commune, thereby imposing: \( \tau_{t}^{\text{agr}} = \tau_{t}^{\text{na}} \). Columns (4) and (5) present the corresponding estimates obtained through pooled OLS, with a province fixed effect.

The results are striking, as they tend to confirm all the hypotheses made above. Communas with more inquilinos are more likely to display stronger support in favour of the right-wing party in 1957, but this influence completely vanishes in the 1965 elections. Thus, in 1957, in a communa with a share of inquilinos in the number of voters higher by one standard deviation, 0.150, the expected share of the right-wing party is higher by 4.1%, which represents an relative increase in the right-wing votes of more than 12% (=0.04/0.33).

Moreover, this influence completely disappears in 1965. The coefficient estimated, \( \beta_{\Delta 65} \), is negative and significant, and \( \beta_{\Delta 65} + \beta_{\Delta 65} \) does not differ from \( \gamma_{\Delta 65} + \gamma_{\Delta 65} \) the corresponding coefficients for the other agricultural workers, nor from those of the other voters (i.e., 0). The imposition of secret ballot therefore had an important and significant effect, as the impact on right-wing votes of the presence of inquilinos vanishes in the 1965 elections.  

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29 Although not reported here, the provincial dummies attached to the ‘oligarchic’ provinces of O’Higgins, Aconcagua and Colchagua are always significant for the 1965 elections (equal to -0.16, -0.19 and -0.27 respectively, all significant at the 1% level). (While we cannot estimate the provincial fixed effect for 1957 with the panel regressions, the corresponding estimates obtained with the pooled OLS for 1957 are 0.16, 0.27 and 0.34, all significant at the 1% level).
ing those years. Our identification assumption implies that the proportion of inquilinos in the voting population of the municipality does not change over time. However, if he did change, because non inquilinos are much more likely to be registered in 1965 than in 1957, this can then potentially introduce a bias in our estimators, for instance if the registration of non-inquilinos is negatively correlated with the proportion of inquilinos in the voting population at time $t_0$. The 1965 effect we are capturing may thus simply be the effect of an increased registration that is biased against the inquilinos. This is a difficult issue, to which we cannot provide a simple answer.\footnote{Note however that what this argument points out is that the effect of the electoral reforms on the 1965 elections may be over-estimated. But it leaves unbiased the coefficients associated with the inquilinos before the reform.}

We have however tested an alternative model, where we assume that, across all comunas and across time, the proportion of inquilinos who vote remain constant. As a result, any increase in the proportion of registered voters takes place among non-inquilinos (an extreme version of the above argument). Assuming $V_{i,t}^{inq} = \phi N_{i,t}^{inq}$, and neglecting the potential difference in voting behaviour between the two other classes, equation (5.3) becomes:

$$
\frac{RV_{i,t}}{V_{i,t}} = (\rho_{I,t} + \tau_t^{inq}) + \left((\tau_t^{inq} - \tau_t^{ninq})\phi\right) \frac{N_{i,t}^{inq}}{V_{i,t}} + (\theta_t + \varepsilon_{i,t}).
$$

(5.5)

(Alternatively, with some additional assumptions, one can also reintroduce the agricultural workers as a separate category of voters.) The equation above can also be directly estimated, since the RHS variable is simply the number of inquilinos at time $t$ divided by the number of voters at time $t$ (instead of at time $t_0$ as in the basic model). We present the results of this alternative model in Table A3 in the Appendix, which again fully support our basic results.

The above estimates excluded the 1961 elections. The strategy we follow is then to use the proportion of inquilinos in 1955 as a good proxy for the number of inquilinos in all three elections. It also offers the advantage, since it predates the elections, of being (potentially) less endogenous than the 1965 data. In table 4 above, we therefore report the panel estimates with a communa fixed effect on the right-wing party electoral outcomes, using the number of inquilinos in 1955. We
once again ran three different estimates, reported as equations (4), (5) and (6), with similar alternative restrictions. We also report the results obtained using the pooled OLS technique. Note however that, with a panel fixed effect, we cannot estimate the coefficients attached to variables which remain constant over time. As a result the coefficient attached to the proportion of *inquilinos* in the number of registered voters in 1957 cannot be estimated with this technique. (It can be estimated with pooled OLS, but is potentially biased).

The results strikingly support the former estimates. The coefficients, and their standard errors, associated with the 1965 estimates are almost identical. For the 1961 elections however, the results are less conclusive, as the coefficient $\beta_{A1}$ associated with the *inquilinos* in 1961 is negative but is not systematically significant. This is probably due to the *persistence* effect, as one expects the impact of the electoral reform to develop more fully in 1965 than in 1961. (The coefficients associated with the 1961 election are indeed about one half of the corresponding 1965 values).

We also ran estimates for each election separately, using a simple OLS, the results of which are given in the Appendix. There again, the coefficients associated with *inquilinos* in 1965, though still slightly positive, is significantly lower than the corresponding one for the 1957 election. Comparing the *inquilino* coefficient for 1957 (equation A2) to that of 1965 (equation A6), a one standard deviation in the 1955 number of *inquilinos* between two comunas increases right-wing votes by 6.8% in 1957, but only 2.6% in 1965.

Finally, to further test the robustness of the above results, we also allowed for other indicators of the strength of patron-client relationships and of political control by a traditional landed oligarchy. Instead of using the proportion of voters of different types in the voting population, we used the proportion of *inquilinos* in the agricultural labour force in 1955 and 1965 (for the smaller sample excluding the 1961 electoral results) or 1955 (for the larger sample), as a measure of the intensity of the patron-client relationships in the communa, and a measure of land concentration, the share of area owned by farms larger than 200 hectares in the total agricultural area of the communa (again in 1955 and 1965 for the smaller
sample, and in 1955 for the other).\textsuperscript{31} We report the results of these estimations in table 5 below. The estimates, though less precise than in the basic model, are once again entirely consistent with our main hypotheses. It must however be noted now that many coefficients associated with land concentration or agrarian relations in 1965 lose their significance when interacted time and provincial dummies are included in the model, though they remain consistently negative. This once again may be partly attributed to the multicollinearity with the interacted time and provincial dummies, as well as to the less precise nature of the indicators used.

\textbf{5.2.4. Christian-democrat and left-wing votes}

We ran similar regressions for the Christian Democrat and the left-wing votes across the three elections. One can indeed think that, after the introduction of the secret ballot, \textit{inquilinos} are more likely to vote for those parties than for the more conservative Radical Party.\textsuperscript{32} The estimates are given in table 6 below, and the results are once again striking. While, before 1958, the communas with a higher proportion of \textit{inquilinos} tend to vote less in favour of the Christian Democrat and the left-wing party, this impact weakens in 1961, and completely disappears in 1965. The estimates are very robust from one model to another, and are almost all significant at the 1\% level. Moreover, these results continue to hold even when alternative explanatory variables, such as land concentration or the share of \textit{inquilinos} in the agricultural labor force are used (see columns (3), (4), (7), and (8)).

\textsuperscript{31}These land concentration measures are imprecise however, as the censuses only report at the communa level the number of farms per size category. By taking the median of each size class, we computed an estimate of the areas, that we used to compute the shares in area.
\textsuperscript{32}This procedure also provides us with a test of our categorization of political parties (which we borrowed from Valenzuela, 1995), since estimates including the radical party in the right-wing movement would be exactly the opposite of the ones reported here.
5.2.5. The Impact of the 1958 Ballot Reform on Labor Contracts

As can be seen from Table 2 above, between 1955 and 1965, the proportion of *inquilinos* fell considerably in the labour force, by about one third from an average of 0.118 in 1955 to an average of 0.076 in 1965. The proportion of *inquilinos* in the voting population similarly fell from 0.126 in 1955-57 to 0.088 in 1965. Part of this fall might be part of a declining trend in long-term patron-client relationships in the countryside. However, it is clear that the 1958 ballot reform also greatly reduced the attractiveness of such relationships, and undermined the strength of the landed oligarchy. In this respect, the correlation of those phenomena across provinces is striking. In the province of O’Higgins, right-wing votes fell from 47.4 to 21.8% of the votes, the area controlled by large farms fell from 73.6% to 53.1%, and the proportion of *inquilinos* in the agricultural labor force fell from 20.2 to 11.0. Or, in the Colchagua province, also located in the North Central Valley, right-wing votes fell from 70.2% in 1957 to 22.1% in 1965, while the proportion of *inquilinos* in the labour force fell from 20.4 to 12.0%. However, we could not develop a more formal test here as the impact of the electoral reform was not distinguishable from long term trends in agrarian relations, nor from a ‘reversal to the mean’ effect.

5.3. The Economic Impact of the 1958 Ballot Reform: Land Prices

Our model also predicts that the electoral reforms of 1958 should lead to a fall in the price of land.\textsuperscript{33} To examine this issue, we collected data from the most important national Chilean newspaper, *El Mercurio*, from August 1956 to December 1960. This newspaper has a large advertisement section each week which provides nation-wide announcements of farms offered for sale. While the content of the advertisements vary widely, we restricted our sample to those advertisements which explicitly provide the size of the farm, its price and its province of

\textsuperscript{33}We found two published studies of the behavior of land prices in Chile over this period (CIDA, 1966, p. 343, and Hurtado et al., 1979) both of which find, as we do, significant falls in land prices after 1958. We do not emphasize the results of these studies because their samples and methodologies are unclear.
location.\textsuperscript{34} We moreover restricted the collection of such information to farms which were of at least 50 hectares. We have therefore left out all the other sales advertised. By doing so, we gathered information on 1117 farms proposed for sale over this period.

This procedure is subject to sample selection biases: the characteristics of the farms announced in El Mercurio might not correspond to the usual farms for sale in the countryside, and our collection strategy (farms advertised with enough information and larger than 50 hectares) might make the selection bias even more pronounced. Another worry arose as inflation was high during this period, and we only had at our disposal the annual consumer price indices (or the index of agricultural prices which follows a very similar pattern). We therefore had to compute within each year (from 1 of July of year $t$ to the 1 of July of year $t+1$) the average weekly inflation rate. We thus reconstructed a weekly consumer price index, which was then used to deflate the nominal price of land ($1/7/56=100$) to obtain the real price of land (real price per hectare), the variable of interest here.

Since the electoral reform law was promulgated on May 31, 1958, we first looked at the average price of one hectare of land before and after 31/5/58 according to the province of location. Table 7 summarizes this information. Note first that most land sales tend to be concentrated in the Urban Central Valley, the North Central Valley and the Frontier, which together represent 72 percent of the sales, though only 11 out of 25 provinces. This is a bit unfortunate, as to test the hypothesis that the price of land fell more in the Central Valley, we would ideally need enough observations from the other regions, such as the Great North, the Little North and the Canals regions (those three regions only make up 3.2 percent of the sales) to highlight contrasting patterns across regions.

This being said, land prices in real terms fell after 1958, from 170.9 pesos per hectare before 1958 to 108.8 pesos per hectare after. It is worth noting however that the fall is much more pronounced in the Urban Central Valley and the North

\textsuperscript{34}Sizes came in two different measures, the hectare and the Chilean cuadra. We assumed here that one cuadra was equal 1.44 hectare. We attempted to avoid repeated announcements by deleting identical announcements, within 18 months of the first announcement.
Central Valley compared to the other regions. Also noticeable is the hierarchy in land prices, with land being the most expensive in the Urban Central Valley followed by the North Central Valley.

To interpret the results given in Table 7, however, we need to properly control for the size of the farm and for the possibility of a time trend in land prices. We now turn to regression estimates, in order to investigate the existence of a structural break on the 31st of May, 1958. The basic model we estimated is the following:

\[ P_i = \beta_0 + \beta_1 X_i + \beta_2 X_i^2 + \sum \beta_{3j} R_j + \sum \gamma_t T_t + \delta_0 D_i + \delta_1 X_i D_i + \delta_2 X_i^2 D_i + \sum \delta_{3j} R_j D_i + \varepsilon_i \]  

(5.6)

where \( P_i \) stands for the price of land per hectare, \( X_i \) for the size of the farm in hectares, and \( X_i^2 \) for its square. \( R_j \) is a vector of regional dummies, which takes the value 1 if the farm belongs to the area \( j \) and zero otherwise, \( T_t \) is a year dummy, which takes the value one if the sale takes place in year \( t \), and \( D_i \) is the reform dummy, which takes the value 1 if the sale is advertised after May 31, 1958, and zero otherwise. We once again used a panel estimation technique, with provincial fixed effects, so that we effectively compare the change in land prices within the same province. The results of the estimation are given in Table 8 below, where model 1 just tests the overall fall in land prices after the reform, with province and year fixed effects. It therefore imposes that \( \delta_{3j} = 0 \), for all \( j \). Two results are worth emphasizing. First, there is a structural break in farm prices before and after May 31, 1958. The estimated fall in land prices is rather large, and equal to -67.0 pesos per hectare, a figure very close to the one obtained by the simple comparison of averages in Table 7. With a pre-1958 price of about 170 pesos, this implies that, after the reform, price fell by about one third, after controlling for the year and the province fixed effect. Second, farm size is irrelevant when it is interacted with the reform dummy, which can be explained by the fact that parcelling out for sale is always an available option.

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\(^{35}\) We leave out the case of the Little North as the trend there is driven by a couple of extreme observations.
Models 2, 3 and 4 correspond exactly to the specification described above in equation (5.6). In model 2, we introduce a dummy for each of the 8 regions in Chile, interacted with the reform dummy (since we cannot estimate coefficients which are time invariant, as the one attached to the region dummy). It comes out from that the post reform fall in land prices was not uniform across regions, but tends to be concentrated in the Urban Central Valley and the North Central Valley, the two regions we already singled out as the heart of the landed oligarchy. In models 3 and 4, we introduced instead the provincial fixed effect interacted with the reform dummy. Model 4 was estimated on a reduced set of observations, where we eliminated all farms below 200 hectares (there were 452 of them) and all farms above 5000 hectares (47 observations). In model 5, we used the same model as in 3, but with log of farm size, instead of a quadratic specification. The results obtained are stable across these various alternative estimations.\textsuperscript{36} Falling land prices tend to concentrate mostly in the provinces of Santiago, Curico and Talca (all three from the North Central Valley), and to a lower extent in O’Higgins, Linares, Nuble, Colchagua (all four in the Central Valley), and also Valdivia, Bio-Bio and Coquimbo (though, as we pointed out earlier, the latter estimate is unreliable, and rests upon a couple of extreme observations.). In these ten provinces, the average proportion of \textit{inquilinos} in 1955 with respect to the number of voters in 1957 is 19.9%, while in the other 10 provinces (for which we had at least one transaction recorded), it is only 11.1%.\textsuperscript{37}

Clearly, the 1958 electoral reform had a stronger impact on the Central Valley provinces, which are precisely the ones in which the \textit{inquilino} system, and electoral corruption were the most prevalent.

Even though we do not have firm evidence, it is tempting to attempt to use the price of votes advertised for the period 1910-20 to obtain a plausible estimate of the political rents associated with the control of one’s workers votes on a farm in 1957. According to a few pieces from historical studies, we have some information

\textsuperscript{36}Similar results were obtained when we introduced cubic and quadratic terms in farm size, or a weekly trend, with no appreciable changes in the other coefficients.

\textsuperscript{37}This percentage falls to 7.7% if we take all the 15 provinces that were not listed in the text.
on the price of a vote in urban areas for the elections of 1909, 1915 and 1918. Prices vary a lot from one source to another (they are directly comparable since there was no inflation during this period), depending on the type of election (presidential or parliamentary), and the degree of competition between political parties. Thus, according to Heise (1982) prices vary between 25 and 35 pesos in 1909, 10 to 40 pesos in 1915, and 100 to 200 pesos (and even between 400 and 500 pesos, “equivalent to a one-year salary for a lower class person”) for the 1918 elections. The political history by Rivas Vicuña (1964, p. 579), himself an active politician in this period, reports a price of 2000 pesos for the 1915 election.

We take as a benchmark for this discussion a vote price of 100 pesos in 1915. Between 1915 and 1957, the number of registered voters went up from 383000 (Cruz-Coke, 1984, p. 36-7) to 1,284,159. The Consumer Price Index (CPI) went from 1 in 1915 to 24.4 in 1952 and 181.3 in 1957 (Mitchell, 1998, Table H2, p. 712-3). Taking into account the increase in the number of registered voters, and inflation, 100 pesos for one vote in 1915 is equivalent to 5405 pesos in 1957. In 1957, the minimum daily wage of an agricultural worker in Talca was set at 35 pesos (Mamalakis, 1983, Volume 2, Table 14.3), so that the price of a vote in 1915 corresponds in 1957 to 155 work-days at the minimum wage or 60% of the average yearly earnings of an agricultural worker. There is on average 0.54 elections per year. (Every 24 years, there are 13 elections:6 parliamentary, 4 presidential and 3 congressional, as only half of the Congress is re-elected at each parliamentary election). Over a lifetime, with a real discount rate of 5%, the control of one’s vote in 1957 therefore amounts to 55 months of work at the minimum wage rate.

Consider now a typical farm in the North Central Valley in 1955.\textsuperscript{38} A typical farm between 1000 and 5000 hectares employed 111.0 workers, out of which 32.3 were inquilinos. As most inquilinos (and workers) live with their families, the landlord often also controlled their spouses’ votes, which represents a control over 64.6 votes.\textsuperscript{39} If we consider all the farm employees, and their spouses, the

\textsuperscript{38}The figures on the number of workers is drawn from the agricultural census, the value of the farm is computed from the land price data, as the average of the price of all farms between 1000 and 5000 has that were proposed for sale in O’Higgins before may 1958.

\textsuperscript{39}Women were granted the right to vote in 1949 in Chile.
landowner controls the votes of 222.0 workers. Given the average value of such a farm (65.99 million pesos in 1957), at a discount rate of 5%, the political rents associated with the control of the *inquilinos'* votes correspond to 5.9% of the value of the farm. If such power extends to all workers on the estate, and their spouses, the political rents represent between 19.8% of the its value.

This exercise is of course at best indicative of the value of a vote in 1957 since we have to assume some correspondence between the nature of electoral corruption in the 1950’s and the system of vote buying which took place at the beginning of the century. Moreover, inflationary pressures may have distorted relative prices. However, the figures obtained look perfectly sensible, though the fall below our empirical estimates (land prices in the Urban and North Central Valley fell by about one third). One may however argue that they probably constitute a very conservative estimate of the political rents enjoyed by large landlords. First, the number of dependents on a large farm is probably underestimated, even if we take into account all workers and their spouses since we omitted for instance the landlord’s tenants or his main trading partners. Secondly, the sale of votes is to some extent a metaphor which certainly does not capture all the political rents, including the social prestige, the electoral positions and the influence over policies (such as those with respect to the ability of trade unions to organize), that landlords enjoyed.

5.4. Alternative Hypotheses

It seems hard to imagine that there is a plausible alternative story which can explain the facts we have shown before 1958 and what happened afterwards in Chile. However, there may be other possible interpretations of part of this evidence. Clearly, it is possible that land concentration and real land prices might have fallen for several reasons apart from the fact that the secret ballot removed the political rents which had previously accrued to land ownership (and were capitalized in its value).

There is one other obvious main alternative hypothesis that accepts the fact that before 1958 electoral corruption stopped rural voters expressing their political
preferences, but it emphasizes different mechanisms linking electoral reform to the data. This idea is that after electoral reform, a left-wing president and government was much more likely. Such a government would aim at redistributing income and assets, particularly land. Such redistribution, once anticipated, would clearly tend to reduce the attractiveness of holding land, thus leading to a fall in concentration and land prices. This hypotheses seems all the more convincing because we know ex post that agrarian reform became such an important political issue in the late 1960’s and early 1970’s in Chile.

We argue that this mechanism, though possibly present to some extent, is not really generally plausible, nor in fact consistent with all of our evidence. Since this hypothesis accepts the importance of voter control before 1958, it is however consistent with the empirical evidence we have shown connecting the right-wing vote to land concentration and the presence of a dependent labor force. Moreover, this hypothesis does seem able to predict falling land prices and falling land concentration after 1958.

There are two main problems with it. The first concerns the implausibility that the land reforms of the late 1960’s and early 1970’s could have been anticipated in the late 1950’s. The second concerns its inconsistency with our data. Firstly, the Alessandri government between 1958 and 1964 was Conservative and did not adopt a redistributive agenda at all. Therefore the politics of this government cannot account for the fall in real land prices. A clear piece of evidence on this is that after the 1958 election, the stock market actually rose! Figure 2 from Couyoumdjian, Millar, and Tocornal (1992) shows the real value of the stock market index in Chile from 1928 to 1978. The real value of stocks declined continuously from the 1930’s through to the coup of 1973, reaching its nadir with the election of Salvador Allende in 1970. The authors explain this secular decline as being due to the increased intervention of the government in the economy, commenting

“the 1930-1960 period was scarcely auspicious for stock-market operations. It began with a deep depression, which finished in 1932... From then on began an unequivocal process of deterioration, which had to do with the increasing state intervention in the economy, which,
directly or indirectly, constrained free enterprise. It was limited in its development by price controls, tax increases, high inflation and other measures of distrust... Stock-market activity was not more than a reflection of the decreased participation of the private sector” (p. 309).

Crucial for our argument here however is that there was an increase after Alessandri’s election. Though the increase itself is small, what the picture does show is that the fall in the index actually levelled off after 1958 and only resumed its fall around 1966. This is directly contrary to the claim that asset prices were falling because of the anticipation of socialism. If this were true one would have expected a more rapid fall, not a rise.

Moreover, while agrarian reform had been occasionally discussed in Chile since the early 1920’s, it was not treated as a policy that might seriously be implemented until the end of the 1960’s. Some marginal land purchases and redistributions took place between 1962 and 1964 under the 1962 Law 15020, but they were explicitly targeted towards unused or abandoned estates. Very little land was redistributed during this period. (Actually, 70% of the land thus affected came from abandoned state farms, and 40% from a single large state farm in Talca.) As a result, the value of cultivated farm land could not have been affected by these minor reforms (for a detailed account of these, see Loveman, 1976). As Kaufman underlines, “the Alessandri administration did initiate some legislation dealing with peripheral issues in the land-tenure problem ... But it pointedly avoided any approach to the question of expropriating and redistributing large, private estates” (Kaufman, 1967, p. 9).

Land reform based on the size of properties only became a real issue in 1964-66 with the success of the Cuban revolution and the counterrevolutionary drive of United States foreign policy, particularly Kennedy’s Alliance for Progress (see the discussion in Loveman, 1976, p. 220). The law was however voted only in July 1967, and its implementation started only in 1969. Consistent with this Swift (1971, p. 68) argues that “landowners did not really begin to fear expropriation until after July 1967, when it became possible to expropriate land for the motive of size alone.” Moreover, after a study of agricultural investment behavior in the
early 1960’s, Swift concludes (p. 68): “The examination of investment behavior, therefore, does not clearly support an interpretation of lower investment through fear of expropriation”. The evidence therefore suggests that the anticipation of land reform cannot have been the factor depressing land concentration and prices in the late 1950’s. Instead, the most plausible explanation is the one proposed by our theory; with the introduction of the secret ballot the price of land fell since the return to landownership fell.

The second problem with this alternative hypothesis is that while the evidence we discussed above shows that land prices were generally falling after 1958, as one would expect if agrarian reform were anticipated, it is not in fact generally true that land concentration was falling. Actually, as we showed, land concentration increased in 9 provinces. It was only in the Central Valley provinces where the traditional oligarchy and patrón-inquilino relations were concentrated that land distribution became more egalitarian. This observation is important because the land reform legislation that began to threaten the expropriation of large farms after 1967 in no way discriminated against the oligarchic Central Valley provinces. A large farm in Tarapacá or Talca, was just as likely to be redistributed as one in O’Higgins. While our theory does not explain why land concentration increased in provinces like Tarapacá, it is perfectly consistent with the fact that concentration went up (for example because of changes in technology). It seems implausible however that in provinces where land concentration was already extremely high, people anticipating land reform would purchase more land and form larger farms.

One can think of other hypotheses consistent with parts of our story. First, there might be a secular falling trend in land prices (though actually the evidence in Hurtado et a. 1979, shows that deflated land prices rose steadily from the 1930’s until the late 1950’s). The results obtained with a time trend tend to show a decline in land prices (note however that the period of time covered is very short). Yet, that the fall tends to be more pronounced in exactly those provinces dominated by the landed oligarchy, directly supports our hypothesis. Second, the fall in land prices after 1958 might be due to the fact that land is often held as a hedge against inflation and, under the Alessandri government, the post 1958 period enjoyed much more monetary stability than the years before. As a
result, landholders may have decided to sell the land they accumulated during the inflationary period, so that a general fall in land prices should occur after 1958. Once again, we cannot entirely disprove this other hypothesis, even though the fact that fewer land transactions occurred after 1958 argues against it (see Table 7). Alternatively, over the long-run demographic factors could explain why land concentration may have fallen in some areas rather than others. Nevertheless, these ideas can only explain part of the overall picture while our theory provides a unified account of a whole set of political and economic phenomena.

6. Conclusions

In this paper we develop a simple model of the ‘market for votes’ to study the nature of political equilibria when votes can be bought and sold, a situation we associate with the absence of an effective secret ballot. The historical literature suggests an important distinction between direct and indirect vote buying. When vote buying is direct, individuals sell their own votes to political parties. When vote buying is indirect, people also sell the votes of others. Interestingly, the preponderance of evidence suggests that it is indirect vote buying that is the more important phenomenon. We showed that this may be the case because it is cheaper for parties to buy votes indirectly, so that a market for votes may appear under indirect vote buying even if no votes were actually bought under direct vote buying. We also demonstrated that direct vote buying changes the political equilibrium when parties valuations of votes are sufficiently different, while the addition of indirect vote buying alters the outcome when parties valuations are sufficiently close. Further, we demonstrate that while direct vote buying is socially efficient, indirect vote buying is inefficient in exactly the circumstances where it changes political outcomes.

We then provided a microfoundation for why some individuals sell the votes of others in equilibrium. If the employment relationship is subject to moral hazard then the resulting rents conceded by employers to workers gives them a comparative advantage in controlling the political activities of their workers. This generates an added incentive to own land and increases the demand for labor.
We tested the predictions of the model by examining in detail the effects of the introduction of the secret ballot in Chile in 1958. We show that, consistent with our theory, the political reforms led to large changes in voting behavior and falls in the employment of dependent laborers and reductions in land prices.

This evidence suggests to us that electoral corruption, and the economic and political incentives that it created, is an important part of the story for why inequality has been so high historically in Latin America and possibly also an important part of the story about why long-run economic performance in Latin American has been so disappointing (on which see Engerman and Sokoloff, 1997, and Posada-Carbó, 2000, who argue for the central importance of electoral corruption in Latin American political history).

Though our analysis focused on vote buying, this can be thought of as a metaphor for a wide variety of political favors or policies that transfer rents to the landlords. Moreover, the political control that rents allow employers to exercise applies much more generally, even in situations where there is an effective secret ballot. Any type of observable political activity, collective actions, demonstrations, trade unionism, political activism, can all be controlled by the threat of losing ones employment and the rent that it provides.
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Appendix 1 Sources and methodology

Agricultural workers’ and ‘inquilinos’ are the total number of agricultural workers and the total number of inquilinos working in the agricultural sector in 1955 and 1964-5 respectively. Source: III Censo Nacional Agricola Ganadero, 1955, Vol. 1-6, Servicio Nacional de Estadistica y Censos, Republica de Chile; IV Censo Nacional Agro-pecuario 1964-65, Vol. 1-26, Direccion de Estadistica y Censos, Republica de Chile. ‘Right-wing votes’ is the proportion of votes in favor of the ‘Conservador’, ‘Conservador Tradicionalista’ and ‘Liberal’ parties in the total number of valid votes, in the parliamentary elections of 1957, 1961, and 1965 respectively; ‘radical’ refers to the proportion of votes in favor of the ‘Radical’ and ‘Radical Doctrinario’ parties in the total number of valid votes, in the parliamentary elections of 1957, 1961, and 1965 respectively; ‘christian democrat’ is the proportion of valid votes in favor of the ‘Falangia Nacional’ in 1957 and the ‘Democrata Christiano’ party for the years 1961, 1965 and 1969. The ‘left’ includes the proportion of valid votes in favor of the ‘Communista’, ‘Socialista’ and ‘Socialista Popular’ parties in 1957, 1961 and 1965 respectively. The regrouping of the political parties was made according to the methodology followed by Valenzuela (1978). The number of voters is the number of valid votes in the 1953 and 1957 elections. We chose parliamentary elections only because of their comparability across years and the stability of the major parties over the years. Presidential and Municipal elections in those years followed very closely the pattern followed by the parliamentary elections. Sources: Direccion del Registro Electoral, Election ordinaria de senadores y diputados al Congreso Nacional (periodo constitucional 1953-7), Chile; Direccion del Registro Electoral, Variacion Porcentual de los Partidos Politicos, 1957-1971, Chile.
Figure 1: Right-wing votes in 1957 and 1965 and the ratio of inquilinos to registered voters in 1955 (scatter plot and simple regression line)

\[
\text{Right57} = 0.319 + 0.523 \text{ Inq/voter55} \\
(0.017)(0.078)
\]

\[
\text{Right65} = 0.149 + 0.145 \text{ Inq/voter55} \\
(0.010)(0.047)
\]
Table 1: The percentage of votes received by major Chilean parties 1949-69

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative and Liberals</td>
<td>42.0</td>
<td>25.3</td>
<td>33.0</td>
<td>30.4</td>
<td>12.5</td>
<td>20.0</td>
</tr>
<tr>
<td>Radicals</td>
<td>27.7</td>
<td>15.6</td>
<td>22.1</td>
<td>21.4</td>
<td>13.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Christian-Democrats</td>
<td>3.9</td>
<td>2.9</td>
<td>9.4</td>
<td>15.4</td>
<td>42.3</td>
<td>29.8</td>
</tr>
<tr>
<td>Socialists and Communists</td>
<td>9.4</td>
<td>14.2</td>
<td>10.7</td>
<td>22.1</td>
<td>22.7</td>
<td>28.1</td>
</tr>
</tbody>
</table>
### Table 2: Agrarian relations, land concentration and electoral results in Chile

<table>
<thead>
<tr>
<th>Region</th>
<th>Share of total area operated by farms over 200 has in 1930 (%)</th>
<th>Share of total area operated by farms over 200 has in 1955 (%)</th>
<th>Proportion of inquilinos in the labour force in 1955 (%)</th>
<th>Proportion of inquilinos in the labour force in 1965 (%)</th>
<th>Proportion of right-wing votes in 1957 elections (%)</th>
<th>Proportion of right-wing votes in 1961 elections (%)</th>
<th>Proportion of right-wing votes in 1965 elections (%)</th>
<th>Proportion of christian-democrat and left-wing votes in the 1957 elections (%)</th>
<th>Proportion of christian-democrat and left-wing votes in the 1957 elections (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central Valley (O’Higgins, Colchagua, Curico, Talca)</td>
<td>86.4</td>
<td>75.7</td>
<td>19.6</td>
<td>12.0</td>
<td>18.9</td>
<td>50.0</td>
<td>17.3</td>
<td>12.4</td>
<td>61.6</td>
</tr>
<tr>
<td>Urban Central Valley (Valparaiso, Santiago, Aconcagua)</td>
<td>93.3</td>
<td>88.5</td>
<td>19.1</td>
<td>11.8</td>
<td>17.2</td>
<td>40.8</td>
<td>35.0</td>
<td>16.0</td>
<td>17.7</td>
</tr>
<tr>
<td>South Central Valley (Maule, Linares, Nuble)</td>
<td>72.5</td>
<td>60.1</td>
<td>12.7</td>
<td>8.2</td>
<td>14.6</td>
<td>40.5</td>
<td>31.4</td>
<td>17.2</td>
<td>8.9</td>
</tr>
<tr>
<td>All Central Valley Provinces</td>
<td>84.3</td>
<td>74.9</td>
<td>17.4</td>
<td>10.8</td>
<td>17.1</td>
<td>44.4</td>
<td>34.4</td>
<td>16.9</td>
<td>13.1</td>
</tr>
<tr>
<td>Frontier and Little North Provinces (Concepcion, Bio-bio, Arauco, Malleco, Cautin, Atacama, Coquimbo)</td>
<td>85.7</td>
<td>68.9</td>
<td>10.8</td>
<td>5.9</td>
<td>11.2</td>
<td>31.2</td>
<td>25.7</td>
<td>11.8</td>
<td>22.3</td>
</tr>
<tr>
<td>All other provinces (Valdivia, Osorno, Llanquihue, Chiloe, Aysen, Magallanes, Tarapaca, Antofagasta)</td>
<td>82.2</td>
<td>69.4</td>
<td>5.7</td>
<td>5.2</td>
<td>8.2</td>
<td>26.6</td>
<td>26.5</td>
<td>15.1</td>
<td>24.4</td>
</tr>
<tr>
<td>Chile (average across all provinces)</td>
<td>84.0</td>
<td>71.4</td>
<td>11.8</td>
<td>7.6</td>
<td>12.6</td>
<td>35.0</td>
<td>29.4</td>
<td>14.8</td>
<td>19.2</td>
</tr>
</tbody>
</table>

Note: For the Santiago province, we excluded the four exclusively urban districts of the city of Santiago. The averages are computed by giving an equal weight to each province.
Table 3: Impact of agrarian relations on right-wing votes before and after the 1958 electoral reform

<table>
<thead>
<tr>
<th></th>
<th>1957</th>
<th>1961</th>
<th>1965</th>
<th>Difference 65-55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of inquilinos to the number of registered voters in 1955 below median (&lt;0.134)</td>
<td>0.336</td>
<td>0.318</td>
<td>0.166</td>
<td>-0.170</td>
</tr>
<tr>
<td>Ratio of inquilinos to the number of registered voters in 1955 above median</td>
<td>0.478</td>
<td>0.386</td>
<td>0.181</td>
<td>-0.297</td>
</tr>
<tr>
<td>Difference</td>
<td>0.132</td>
<td>0.068</td>
<td>0.015</td>
<td><strong>-0.127</strong></td>
</tr>
</tbody>
</table>
Table 4: Impact of agrarian relations on right-wing votes: the basic model

<table>
<thead>
<tr>
<th>Dependent variable is</th>
<th>Panel, communa fixed effect</th>
<th>Pooled OLS</th>
<th>Panel, communa fixed effect</th>
<th>Pooled OLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Inq/voter</td>
<td>0.270**</td>
<td>0.198*</td>
<td>0.190*</td>
<td>0.533***</td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.116)</td>
<td>(0.114)</td>
<td>(0.061)</td>
</tr>
<tr>
<td>Inq/voter* 1965dummy</td>
<td>-0.386***</td>
<td>-0.271***</td>
<td>-0.286***</td>
<td>-0.318***</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.083)</td>
<td>(0.067)</td>
<td>(0.118)</td>
</tr>
<tr>
<td>Inq/voter55</td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Inq/voter* 1965dummy</td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ignoninq/voter</td>
<td>-0.082***</td>
<td>-0.013</td>
<td>No</td>
<td>-0.022**</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.024)</td>
<td>(0.011)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Ignoninq/voter* 1965dummy</td>
<td>0.047***</td>
<td>0.004</td>
<td>No</td>
<td>0.045***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.013)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Ignoninq/voter55</td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ignoninq/voter* 1965dummy</td>
<td>0.025***</td>
<td>0.014</td>
<td>No</td>
<td>0.026**</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Ignoninq/voter55* 1965dummy</td>
<td>0.041***</td>
<td>0.002</td>
<td>No</td>
<td>0.042**</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Time dummy:1961</td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Time dummy:1965</td>
<td>-0.198***</td>
<td>-0.159***</td>
<td>-0.161***</td>
<td>-0.208***</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.046)</td>
<td>(0.044)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Provinc*time dummies</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td># obs.</td>
<td>492</td>
<td>492</td>
<td>492</td>
<td>492</td>
</tr>
<tr>
<td>R² adj</td>
<td>0.707</td>
<td>0.834</td>
<td>0.834</td>
<td>0.620</td>
</tr>
</tbody>
</table>

Note: ***indicates significance at the 1% level, ** at the 5% level and * at the 10% level. For panel fixed effect estimates, we report the within R-square.
Table 5: Impact of agrarian relations on right-wing votes: alternative models

<table>
<thead>
<tr>
<th>The dependent variable is:</th>
<th>the proportion of votes for the right-wing parties in the 1957 and 1965 congressional elections (panel, communa fixed effect, standard errors under brackets)</th>
<th>the proportion of votes for the right-wing parties in the 1957,1961 and 1965 congressional elections (panel, communa fixed effect, standard errors under brackets)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Inq/agric</td>
<td>0.544*** (0.134)</td>
<td>0.176 (0.127)</td>
</tr>
<tr>
<td>Inq/agric* 1965dummy</td>
<td>-0.766*** (0.176)</td>
<td>-0.259 (0.178)</td>
</tr>
<tr>
<td>Inq/agric55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inq/agric55* 1961dummy</td>
<td></td>
<td>-0.350*** (0.086)</td>
</tr>
<tr>
<td>Inq/agric55* 1965dummy</td>
<td></td>
<td>-0.630*** (0.086)</td>
</tr>
<tr>
<td>Large farms</td>
<td>0.182* (0.096)</td>
<td>0.046 (0.084)</td>
</tr>
<tr>
<td>Large farms* 1965dummy</td>
<td>-0.181*** (0.051)</td>
<td>-0.010 (0.050)</td>
</tr>
<tr>
<td>Largefarms55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largefarms55* 1961dummy</td>
<td></td>
<td>-0.131*** (0.043)</td>
</tr>
<tr>
<td>Largefarms55* 1965dummy</td>
<td></td>
<td>-0.181*** (0.043)</td>
</tr>
<tr>
<td>Time dummies</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Provincial dummies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time dummies * provincial dummies</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td># obs</td>
<td>492</td>
<td>492</td>
</tr>
<tr>
<td>within $R^2$</td>
<td>0.698</td>
<td>0.824</td>
</tr>
</tbody>
</table>

Note: *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.
Table 6: Impact of agrarian relations on christian-democrat and left-wing votes

<table>
<thead>
<tr>
<th>Dependent variable is</th>
<th>the proportion of votes for the christian-democrat and the left-wing parties in the 1957 and 1965 congressional elections (panel, communa fixed effect)</th>
<th>the proportion of votes for the christian-democrat and the left-wing parties in the 1957, 1961 and 1965 congressional elections (panel, communa fixed effect)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Inq/voter</td>
<td>-0.196 (0.129)</td>
<td>-0.104 (0.194)</td>
</tr>
<tr>
<td>Inq/voter*1965dummy</td>
<td>0.338*** (0.078)</td>
<td>0.205*** (0.074)</td>
</tr>
<tr>
<td>Inq/voter55*1961dummy</td>
<td></td>
<td>0.136** (0.058)</td>
</tr>
<tr>
<td>Inq/voter55*1965dummy</td>
<td></td>
<td>-0.035 (0.057)</td>
</tr>
<tr>
<td>Inq/agric</td>
<td>-0.384*** (0.127)</td>
<td></td>
</tr>
<tr>
<td>Inq/agric*1965dummy</td>
<td>0.781*** (0.167)</td>
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</tr>
<tr>
<td>Inq/agric55*1961dummy</td>
<td></td>
<td>0.223*** (0.081)</td>
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<tr>
<td>Inq/agric55*1965dummy</td>
<td></td>
<td>0.536*** (0.081)</td>
</tr>
<tr>
<td>Large farms</td>
<td>-0.167* (0.091)</td>
<td></td>
</tr>
<tr>
<td>Large farms*1965dummy</td>
<td>0.149*** (0.048)</td>
<td></td>
</tr>
<tr>
<td>Large farms55*1961dummy</td>
<td></td>
<td>0.080** (0.040)</td>
</tr>
<tr>
<td>Large farms55*1965dummy</td>
<td></td>
<td>0.150*** (0.040)</td>
</tr>
<tr>
<td>Agnoning/voter*time dummy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time dummy:1961</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time dummy:1965</td>
<td>0.412*** (0.018)</td>
<td>0.363*** (0.041)</td>
</tr>
<tr>
<td>Provincial *time dummies</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td># obs.</td>
<td>492</td>
<td>492</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.885</td>
<td>0.943</td>
</tr>
</tbody>
</table>

Note: standard errors under brackets, ***indicates significance at the 1% level, ** at the 5% level and * at the 10% level.
Table 7: Real price per hectare before and after the electoral reform (May 1958)

<table>
<thead>
<tr>
<th>Region</th>
<th>Land prices before the reform (standard errors between brackets)</th>
<th>Land prices after the reform (standard errors between brackets)</th>
<th>Average proportion of inquilinos in 1955 in the number of registered voters in 1957</th>
<th>Number of observations before the reform</th>
<th>Number of observations after the reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great North (Tarapaca, Antofagasta) and Little North (Atacama, Coquimbo)</td>
<td>173.4 (219.9)</td>
<td>46.5 (58.9)</td>
<td>0.041</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Central Urban Valley (Valparaiso, Santiago, Aconcagua)</td>
<td>312.7 (311.8)</td>
<td>213.3 (210.0)</td>
<td>0.172</td>
<td>136</td>
<td>117</td>
</tr>
<tr>
<td>North Central Valley (Ohiggins, Colchagua, Curico, Talca)</td>
<td>220.0 (220.0)</td>
<td>119.6 (125.0)</td>
<td>0.189</td>
<td>138</td>
<td>152</td>
</tr>
<tr>
<td>South Central Valley (Maule, Linares, Nuble)</td>
<td>119.3 (120.9)</td>
<td>79.7 (59.1)</td>
<td>0.146</td>
<td>84</td>
<td>69</td>
</tr>
<tr>
<td>The Frontier (Concepcion, Bio-bio, Arauco, Malloco, Cautin)</td>
<td>70.9 (68.7)</td>
<td>58.8 (98.6)</td>
<td>0.125</td>
<td>157</td>
<td>109</td>
</tr>
<tr>
<td>The Lakes (Valdivia, Osorno, Llanquihue) and the Canals (Chiloe, Aysen, Magallanes)</td>
<td>56.4 (52.9)</td>
<td>31.9 (45.3)</td>
<td>0.108</td>
<td>53</td>
<td>75</td>
</tr>
<tr>
<td>Chile</td>
<td>170.9 (217.1)</td>
<td>108.8 (144.3)</td>
<td>0.126</td>
<td>585</td>
<td>532</td>
</tr>
</tbody>
</table>
Table 8: Real Prices per hectare before and after the reform (May 1958)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm size</td>
<td>-0.020***</td>
<td>-0.019***</td>
<td>-0.019***</td>
<td>-0.085***</td>
<td>LOG -60.48***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.017)</td>
<td>(4.66)</td>
</tr>
<tr>
<td>Farm size*reform dummy</td>
<td>0.007*</td>
<td>0.007</td>
<td>0.006</td>
<td>0.009</td>
<td>LOG 15.9**</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.027)</td>
<td>(7.19)</td>
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<td>Square of farm size</td>
<td>2.38e-07***</td>
<td>2.25e-07***</td>
<td>2.21e-07***</td>
<td>LOG 15.9**</td>
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<tr>
<td></td>
<td>(4.77e-08)</td>
<td>(4.81e-08)</td>
<td>(4.87e-08)</td>
<td>(4.31e-06)</td>
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<tr>
<td>Square of farm size*reform dummy</td>
<td>-1.02e-07</td>
<td>-8.51e-08</td>
<td>-7.59e-08</td>
<td>2.35e-06</td>
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<td></td>
<td>(7.38e-08)</td>
<td>(7.51e-08)</td>
<td>(7.64e-08)</td>
<td>(7.24e-08)</td>
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<td>Reform dummy</td>
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<td>-132.6*</td>
<td>-127.1*</td>
<td>-122.8**</td>
<td>-177.9**</td>
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<td></td>
<td>(19.0)</td>
<td>(74.9)</td>
<td>(75.1)</td>
<td>(56.9)</td>
<td>(83.0)</td>
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<td>Little North*reform dummy</td>
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<tr>
<td>(Coquimbo only)</td>
<td>-108.4***</td>
<td>-129.1***</td>
<td>-140.6***</td>
<td>-215.7***</td>
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</tr>
<tr>
<td></td>
<td>(25.0)</td>
<td>(26.7)</td>
<td>(25.9)</td>
<td>(43.6)</td>
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</tr>
<tr>
<td>Central Valley Urban*reform dummy</td>
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<tr>
<td>Aconcagua*reform dummy</td>
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<td>-79.6</td>
<td>-150.4*</td>
<td>-150.4*</td>
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<td></td>
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<td>(58.7)</td>
<td>(80.4)</td>
<td>(80.4)</td>
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<td>Valparaiso*reform dummy</td>
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<td>-81.7</td>
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<td>(62.3)</td>
<td>(58.2)</td>
<td>(68.9)</td>
<td>(68.9)</td>
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<tr>
<td>Santiago*reform dummy</td>
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<td>-140.6***</td>
<td>-215.7***</td>
<td>-215.7***</td>
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<tr>
<td></td>
<td>(26.7)</td>
<td>(25.9)</td>
<td>(43.6)</td>
<td>(43.6)</td>
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</tr>
<tr>
<td>North Central Valley*reform dummy</td>
<td>-88.6***</td>
<td>-129.1***</td>
<td>-140.6***</td>
<td>-215.7***</td>
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<tr>
<td></td>
<td>(25.4)</td>
<td>(26.7)</td>
<td>(25.9)</td>
<td>(43.6)</td>
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<td>O'Higgins*reform dummy</td>
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<td>-120.8***</td>
<td>-167.3***</td>
<td>-167.3***</td>
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<tr>
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<td>(41.1)</td>
<td>(58.8)</td>
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<tr>
<td>Colchagua*reform dummy</td>
<td>-61.6</td>
<td>23.2</td>
<td>-173.1***</td>
<td>-173.1***</td>
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<td>(51.2)</td>
<td>(41.9)</td>
<td>(60.5)</td>
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<td>Curico*reform dummy</td>
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<td>-144.4***</td>
<td>-144.4***</td>
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<td></td>
<td>(39.5)</td>
<td>(32.2)</td>
<td>(53.3)</td>
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<tr>
<td>Talca*reform dummy</td>
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<td>-102.5***</td>
<td>-198.6***</td>
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<td>(51.7)</td>
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<tr>
<td>Region</td>
<td>Coefficient (Std. Error)</td>
<td>Coefficient (Std. Error)</td>
<td>Coefficient (Std. Error)</td>
<td>Coefficient (Std. Error)</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>South Central Valley</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*reform dummy</td>
<td>-40.3 (31.5)</td>
<td>-13.5 (66.7)</td>
<td>-31.1 (56.9)</td>
<td>-128.7* (73.2)</td>
<td></td>
</tr>
<tr>
<td>Maule</td>
<td></td>
<td>-89.6 (54.9)</td>
<td>-164.5*** (45.1)</td>
<td>-148.2** (63.0)</td>
<td></td>
</tr>
<tr>
<td>Linares</td>
<td></td>
<td>-18.6 (39.1)</td>
<td>-66.2** (29.4)</td>
<td>-113.8** (54.8)</td>
<td></td>
</tr>
<tr>
<td><strong>The Frontier</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*reform dummy</td>
<td>-7.8 (26.2)</td>
<td>-4.3 (59.3)</td>
<td>-29.1 (39.1)</td>
<td>-84.6 (67.5)</td>
<td></td>
</tr>
<tr>
<td>Concepcion*reform dummy</td>
<td></td>
<td>-35.9 (41.6)</td>
<td>-57.0* (30.2)</td>
<td>-128.3** (57.6)</td>
<td></td>
</tr>
<tr>
<td>Bio-Bio*reform dummy</td>
<td></td>
<td>-104.0 (131.4)</td>
<td>-30.5 (79.2)</td>
<td>-165.1 (130.3)</td>
<td></td>
</tr>
<tr>
<td>Arauco*reform dummy</td>
<td></td>
<td>41.1 (40.8)</td>
<td>-47.2 (32.2)</td>
<td>-62.0 (57.5)</td>
<td></td>
</tr>
<tr>
<td>Malleco*reform dummy</td>
<td></td>
<td>-7.9 (45.7)</td>
<td>-42.5 (31.6)</td>
<td>-106.0* (60.8)</td>
<td></td>
</tr>
<tr>
<td><strong>The Lakes</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>*reform dummy</td>
<td>-39.6 (34.8)</td>
<td>-32.7 (39.2)</td>
<td>-42.8 (29.9)</td>
<td>-118.7** (59.6)</td>
<td></td>
</tr>
<tr>
<td>Valdivia*reform dummy</td>
<td></td>
<td>-41.9 (74.0)</td>
<td>-60.3 (45.5)</td>
<td>-127.1 (82.8)</td>
<td></td>
</tr>
<tr>
<td>Osorno*reform dummy</td>
<td></td>
<td>-28.1 (104.5)</td>
<td>-29.0 (67.2)</td>
<td>-131.2 (108)</td>
<td></td>
</tr>
<tr>
<td><strong>The Canals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*reform dummy (Chiloe only)</td>
<td>-8.7 (13.51)</td>
<td>-1.26 (171.6)</td>
<td>-30.4 (97.4)</td>
<td>-152.8 (167.4)</td>
<td></td>
</tr>
<tr>
<td>Chiloe*reform dummy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Number of observations</td>
<td>1117</td>
<td>1117</td>
<td>1117</td>
<td>618</td>
<td>1117</td>
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<tr>
<td>Within R-square</td>
<td>0.106</td>
<td>0.120</td>
<td>0.129</td>
<td>0.240</td>
<td>0.244</td>
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</table>
Figure 2. Chilean Real Stock Market Index, 1928-1978
Table A1: Description of the main variables used in section 5

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<tr>
<th>Variable</th>
<th># obs.</th>
<th>Mean</th>
<th>Standard Dev.</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Variable name</th>
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<tbody>
<tr>
<td>Right-wing votes in 1957</td>
<td>246</td>
<td>0.407</td>
<td>0.195</td>
<td>0.399</td>
<td>0</td>
<td>0.914</td>
<td>Right57</td>
</tr>
<tr>
<td>Right-wing votes in 1961</td>
<td>246</td>
<td>0.352</td>
<td>0.160</td>
<td>0.337</td>
<td>0</td>
<td>0.846</td>
<td>Right61</td>
</tr>
<tr>
<td>Right-wing votes in 1965</td>
<td>246</td>
<td>0.174</td>
<td>0.111</td>
<td>0.156</td>
<td>0</td>
<td>0.577</td>
<td>Right65</td>
</tr>
<tr>
<td>Left and Christian-Democrat votes in 1957</td>
<td>246</td>
<td>0.161</td>
<td>0.141</td>
<td>0.123</td>
<td>0</td>
<td>0.778</td>
<td>Left57</td>
</tr>
<tr>
<td>Left and Christian-Democrat votes in 1961</td>
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<td>0.330</td>
<td>0.134</td>
<td>0.330</td>
<td>0.041</td>
<td>0.792</td>
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<td>Left and Christian-Democrat votes in 1965</td>
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<td>0.575</td>
<td>0.140</td>
<td>0.492</td>
<td>0.212</td>
<td>0.891</td>
<td>Left65</td>
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<td>Ratio of inquilinos in 1955 to the number of registered voters in 1957</td>
<td>246</td>
<td>0.168</td>
<td>0.147</td>
<td>0.134</td>
<td>0</td>
<td>0.761</td>
<td>Inq/voter55</td>
</tr>
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<td>Ratio of inquilinos in 1965 to the number of registered voters in 1957</td>
<td>246</td>
<td>0.153</td>
<td>0.150</td>
<td>0.114</td>
<td>0</td>
<td>1.116</td>
<td>Inq/voter65</td>
</tr>
<tr>
<td>Ratio of inquilinos in 1955 and 1965 to the number of registered voters in 1957</td>
<td>492</td>
<td>0.160</td>
<td>0.148</td>
<td>0.123</td>
<td>0</td>
<td>1.116</td>
<td>Inq/voter</td>
</tr>
<tr>
<td>Proportion of inquilinos in the agricultural labour force in 1955</td>
<td>246</td>
<td>0.162</td>
<td>0.104</td>
<td>0.167</td>
<td>0</td>
<td>0.552</td>
<td>Inq/agric55</td>
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<tr>
<td>Proportion of inquilinos in the agricultural labour force in 1965</td>
<td>246</td>
<td>0.088</td>
<td>0.059</td>
<td>0.078</td>
<td>0</td>
<td>0.327</td>
<td>Inq/agric65</td>
</tr>
<tr>
<td>Ratio of other agricultural workers in 1955 to the number of registered voters in 1957</td>
<td>246</td>
<td>1.069</td>
<td>0.929</td>
<td>0.833</td>
<td>0.000</td>
<td>6.572</td>
<td>Agnoninq/voter55</td>
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<tr>
<td>Ratio of other agricultural workers in 1965 to the number of registered voters in 1957</td>
<td>246</td>
<td>1.743</td>
<td>1.278</td>
<td>1.495</td>
<td>0.007</td>
<td>8.065</td>
<td>Agnoninq/voter65</td>
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<tr>
<td>Ratio of other agricultural workers in 1955 and 1965 to the number of registered voters in 1957</td>
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<td>1.406</td>
<td>1.166</td>
<td>1.131</td>
<td>0.000</td>
<td>8.065</td>
<td>Agnoninq/voter</td>
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<tr>
<td>Share of total area operated by farms over 200 has in 1955</td>
<td>246</td>
<td>0.749</td>
<td>0.217</td>
<td>0.800</td>
<td>0</td>
<td>1.000</td>
<td>Largefarms55</td>
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<tr>
<td>Share of total area operated by farms over 200 has in 1965</td>
<td>246</td>
<td>0.706</td>
<td>0.223</td>
<td>0.756</td>
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<td>0.998</td>
<td>Largefarms65</td>
</tr>
<tr>
<td>Share of total area operated by farms over 200 has in 1955 and in 1965</td>
<td>492</td>
<td>0.728</td>
<td>0.221</td>
<td>0.784</td>
<td>0</td>
<td>1.000</td>
<td>Largefarms</td>
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Table A2: Impact of agrarian relations on electoral results for each separate election (OLS, standard errors under brackets)

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<tr>
<th>Inq/voter55</th>
<th>Right-wing votes in 1957</th>
<th>Right-wing votes in 1961</th>
<th>Right-wing votes in 1965</th>
<th>Change in right-wing votes between 1965 and 1957</th>
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</thead>
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<tr>
<td></td>
<td>(A1)</td>
<td>(A2)</td>
<td>(A3)</td>
<td>(A4)</td>
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<tr>
<td></td>
<td>(A5)</td>
<td>(A6)</td>
<td>(A7)</td>
<td>(A8)</td>
</tr>
<tr>
<td>Inq/voter55</td>
<td>0.537***</td>
<td>0.452***</td>
<td>0.320***</td>
<td>0.112**</td>
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<tr>
<td></td>
<td>(0.080)</td>
<td>(0.079)</td>
<td>(0.067)</td>
<td>(0.047)</td>
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<tr>
<td></td>
<td>0.319**</td>
<td>0.176***</td>
<td>-0.426***</td>
<td>-0.276***</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.040)</td>
<td>(0.071)</td>
<td>(0.070)</td>
</tr>
<tr>
<td>Agnoninq/voter55</td>
<td>-0.013</td>
<td>-0.002</td>
<td>0.0133</td>
<td>0.029***</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.014)</td>
<td>(0.011)</td>
<td>(0.007)</td>
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<td>0.012</td>
<td>-0.000</td>
<td>0.042***</td>
<td>0.002</td>
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<td>(0.012)</td>
<td>(0.007)</td>
<td>(0.011)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Provincial dummies</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Adj R²</td>
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<td>0.414</td>
<td>0.588</td>
<td>0.146</td>
<td>0.474</td>
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Note: ***indicates significance at the 1% level, ** at the 5% level and * at the 10% level.
Table A3: Impact of agrarian relations on right-wing votes under an alternative identification restriction

<table>
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<th>Variable</th>
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<th>(A11)</th>
<th>(A12)</th>
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<tr>
<td>Inq/voter&lt;sub&gt;t&lt;/sub&gt;</td>
<td>0.335***</td>
<td>0.274***</td>
<td>0.350***</td>
<td>0.267**</td>
</tr>
<tr>
<td></td>
<td>(0.124)</td>
<td>(0.104)</td>
<td>(0.126)</td>
<td>(0.108)</td>
</tr>
<tr>
<td>Inq/voter&lt;sub&gt;t&lt;/sub&gt; * 1965dummy</td>
<td>-0.428***</td>
<td>-0.270**</td>
<td>-0.530***</td>
<td>-0.313**</td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.124)</td>
<td>(0.154)</td>
<td>(0.147)</td>
</tr>
<tr>
<td>Agnoninq/voter&lt;sub&gt;t&lt;/sub&gt;</td>
<td></td>
<td>-0.034*</td>
<td>0.006</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td></td>
</tr>
<tr>
<td>Agnoninq/voter&lt;sub&gt;t&lt;/sub&gt; * 1965dummy</td>
<td></td>
<td>0.045***</td>
<td>0.006</td>
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<tr>
<td></td>
<td></td>
<td>(0.027)</td>
<td>(0.015)</td>
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</tr>
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<td>Time dummy: 1965</td>
<td>-0.169***</td>
<td>-0.162***</td>
<td>-0.207***</td>
<td>-166***</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.044)</td>
<td>(0.019)</td>
<td>(0.046)</td>
</tr>
<tr>
<td>Provincial * time dummies</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<td># obs.</td>
<td>492</td>
<td>492</td>
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<td>R&lt;sup&gt;2&lt;/sup&gt; adj</td>
<td>0.683</td>
<td>0.834</td>
<td>0.701</td>
<td>0.834</td>
</tr>
</tbody>
</table>

Note: *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. For panel fixed effect estimates, we report the within R-square.