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Interest Groups, Information Manipulation in the Media, and Public Policy: The Case of the Landless Peasants Movement in Brazil

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ABSTRACT

We extend the literature on interest group behavior and policy outcomes by examining how groups with limited resources (votes and campaign contributions) effectively influence government by manipulating media information to voters. Voters in turn lobby politicians to implement the group's preferred policies. In this manner interest groups can secure favorable government actions beyond their size and wealth. This is an important contribution because of the increased role of the media in the information age and because this linkage better explains observed government policies. We develop a multi-principal, multi-task model of interest group behavior and generate the characteristics of interest groups that would be most successful using publicity to secure their policy objectives. We apply the model to the Landless Peasants' Movement in Brazil. We detail how the Landless Peasants' Movement molds information; show the general voter response; and examine the reaction of politicians in changing the timing and nature of policy.

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I. Introduction.

In this paper we examine how an interest group with limited votes and campaign funds influences political policy through the control of media information to voters. Voters respond to the media by lobbying politicians to adopt the group's desired policies. In this manner such groups can be more effective than their size and wealth could suggest. This is a valuable insight because of the increased role of the media in affecting policy and because this linkage better explains observed government policies.

We build on the interest group literature that generally argues that cohesive, articulate, wealthy, voting groups are most likely to secure favorable government transfers (Peltzman, 1976; Ornstein and Elder, 1978; Becker, 1983; Rothenberg, 1992, 1-5; Grossman and Helpman, 2001; 2002, 2-3, 44). We also draw from the related literature on interest groups as transmitters of information (Austen-Smith, 1999; Grossman and Helpman, 2001, 2002, 2-3; Lohmann, 1998 and Van Winden, 1999 and 2003 for surveys). In this work, information flows from the group to politicians to directly influence their actions and to mobilize voter support through political endorsements.[1] Baron (1994, 1989) incorporates the media into this process. Candidates chose among both particularistic and collective policies to maximize contributions, and use the media to generate favorable voter support. Baron (2005) examines how competing interests (industry and "activists") employ the media to influence public sentiment on environmental policies. Besley, Burgess and Prat (2002), Besley and Burgess (2001) and Stromberg (2004) model the role of the media in making government more responsive to citizens. Rothenberg (1992, 11-43, 251) adds low labor costs in describing the role of organized activists (Common Cause), who use volunteers, along with campaign funds, and

[1] See McKelvey and Ordeshook (1985), Lupia (1992). According to Reuben (2002), "Most of the information literature has concentrated on the information transmission between the interest group and the policymaker. It has neglected to look into the information flow among and within the interest groups." Some exceptions are Grossman and Helpman (1999, 2001) and Cameron and Jung (1995).

media clout to promote legislation. Brewer and Libecap (2008) also model activist environmental groups as having below market wages in selecting to go to trial rather than settling disputes in conflicts over natural resources.

We continue this line of investigation by defining the characteristics of interest groups that successfully influence government policy while lacking both campaign contributions and voting power. We detail how groups utilize and show how they affect government officials in molding the timing and nature of policy. The group also capitalizes on the inability of voters to evaluate the policy's effectiveness.

To illustrate our model we focus on the Landless Peasants Movement (*Movimento Sem-Terra*) or MST and its efforts to influence domestic land reform policy in Brazil. The MST represents a comparatively small and poor sector of the Brazilian electorate, yet it has been remarkably effective in promoting its agenda. Although we direct attention to the MST, our analysis can be generalized to interest group behavior in other contexts.[2] We examine Brazil because it has land distribution problems similar to those facing other Latin American societies and because its interest group politics are comparable to those found elsewhere.

We analyze the politics of land reform in Brazil through a model developed in Section II and detailed in the Appendix with a unitary government, the President or executive.[3] The framework considers Presidential constraints in determining resource allocation. Although there are well-organized, wealthy constituents, large property owners, who oppose land reform, we show how the MST successfully counters by affecting voter perceptions through skillful use of the media.

Our model captures three important aspects of the relationships among interest groups, the electorate, and the government: i) moral hazard from information asymmetries between

[2] Tetlock and Oppenheimer (2008) argue that environmentalists were able to create a "taboo" amongst voters concerning any drilling in the Arctic National Wildlife Refuge (ANWR).
[3] We use a unitary government because it is reflective of the Brazilian setting, but it also is similar to Parliamentary democracies (Alston, Melo, Mueller and Pereira, 2006).

policy makers and interest groups; ii) existence of multiple groups simultaneously pressuring the government; and iii) ability of some groups to disrupt the flow of information from others to the government, thereby indirectly changing equilibrium policy effort. From the model we derive the characteristics that make an interest group specialize in media manipulation rather than contributions or votes. Four important characteristics emerge: 1) the interest group has low labor costs; 2) the interest group has a high productivity of effort to influence voters through the media; 3) the issue of the interest group has high salience and concerns voters; and 4) policy costs are low enough to make the policy response feasible.

Section III provides background information. In Section IV we argue that the MST matches the characteristics from the model, and we provide evidence linking voter preferences to MST actions, media responses, government reactions, and land reform. Although this seems to suggest that the MST helps voters get more of a policy they want, we show that this may not necessarily be the case.

II. A Multiprincipal, Multitask Model of Interest Group Behavior.

Our model extends Dixit (1996, pg.157-171), which is a combination of the multitask model of Holmström and Milgrom (1991) and the multiprincipal model of Bernheim and Whinston (1986). The major innovation is to make the size of the information asymmetry between groups and the government endogenous. We allow each group to dedicate resources to informing or confusing other groups. We describe the model in the context of land reform in Brazil, leaving a formal presentation of a general version in the appendix.

The agent in the model is a unitary government (Executive) that implements a set of policies, including land reform. The three principals are the MST, landowners, and voters, each interested in a specific policy (task). The MST desires expropriation of private land and creation of settlement projects. Landowners want subsidies and oppose land reform. Voters

seek policies that deliver more employment, income, and security, while also sympathizing with land reform.

The government's efforts can be substitutable or complementary across tasks, and the principals offer both campaign contributions and votes to influence the allocation. The principals do not observe the government's effort for each task but rather have limited information on outcomes. These information asymmetries allow the agent to skimp on effort, thereby earning an informational rent.

To see the operation of the model, consider a benchmark where the principals observe the government's effort and act cooperatively. The optimal level of effort in this scenario would be a first-best solution where the marginal cost of effort in each task equals the marginal social benefit. The second step is to relax the assumption of observable effort, but retain cooperation. In this situation contracts between the principals and politicians are contingent on outcomes. The optimal effort now deviates from the first-best. The size of the wedge between these first and second-best situations is a function of the size of the information asymmetry as well as the risk aversion of the government.

The third step is to introduce non-cooperative behavior among the principals. This involves finding the Nash equilibrium of the game where each principal provides separate inducements to the agent and strategically takes into account the actions of others. This equilibrium is even further from the first-best. Because competing inducements cancel, the greater the number of principals the lower the government's effort. This creates a third-best outcome, a direct consequence of the multiprincipal multitask nature of the problem.

The final step allows the three principals to influence policy through inducements (contributions and votes) and by influencing the information available to other parties, especially voters, about the government's efforts in each task. This is a novel contribution of our model. In this context, each principal must decide how to allocate resources between

inducements and information. In this decision, the principal considers both that information manipulation is costly and that the other principals may engage in this action. The solution is a Nash equilibrium, and it implies that the size of resulting information asymmetries between the agent and the principals is endogenous. The optimal levels of government effort continue to be third-best, but the actions of the principals to mold information may lead to changes in the supply and allocation of effort across tasks.

Consider what happens to optimal incentives for political action with a change in the level of information available. Each principal will adjust inducements for a particular policy when more information becomes available regarding the government's effort. Those who benefit from the policy will provide additional inducements now that they have a better notion of what they are receiving from politicians in exchange. Those who oppose will provide fewer inducements as they see that the returns from opposition are lower than previously perceived. These reactions may be reversed, depending on the relative values of the cost and benefit functions. Whatever the case, each interest group can strategically calculate how much and in which direction to affect information so as to pursue its policy preferences.

Implications for the choice of instrument for the interest groups

In order to illustrate the implications of the model for land reform policy in Brazil, consider the government's incentive for choosing how much effort to place on land reform. Voters will offer votes and contributions commensurate with their understanding of outcomes based on (third best) levels of government effort. The second principal, MST desires more land reform and would gain if voters increased their inducements to politicians. Accordingly, MST devotes effort to providing more information to voters about government actions. The new information leads voters to push for more land reform. How much effort MST will choose in this regard is determined by the marginal gains and costs involved.

Interest groups will vary in their proficiencies to influence government directly through votes and contributions, or indirectly through information. The costs and benefits facing each group depend upon its characteristics and the policy it is pursuing. Our model suggests four key characteristics that provide an advantage for an interest group in the provision of information:[4]

i) The higher the marginal cost of influencing information ($G^i_{e_j}$) the lower will be the optimal level of such effort chosen by that group, *ceteris paribus*. If the marginal cost is sufficiently high, then the group will not influence information on that task. Some interest groups may have relative advantages through lower labor costs and therefore be better able to influence the information flow. Note that low opportunity costs are not a sufficient condition for successful mobilization as other complementary characteristics are also necessary. The model shows that groups with high costs of influencing information prefer to pressure politicians through votes or contributions.[5]

[4] The notation refers to the formulas in the appendix.

[5] The low labor cost may also arise due to the availability of workers that are motivated by non-financial objectives as in the not-for-profit literature (see Francois and Vlassopoulos (2008) for a survey). Another impediment to mobilization, which is particularly relevant to the case of landless peasants, is the possibility of repression and violence from other groups or the government. One of the reasons for the success of the MST is

ii) The higher the productivity of effort to mold information received by voters ($\frac{\partial \omega_{jj}(e_j^i, e_j^{-i})}{\partial e_j^i}$), the more effort that will be employed by the group, *ceteris paribus*. Low productivity for some groups may be due to their lack of credibility among voters. Accordingly interest groups that work through the information channel will tend to have reputation advantages and lower costs of being noticed.

iii) The ability of an interest group to affect policy through information depends on the preferences of all other principals (***b***), that is, the salience of the issue. If voters care strongly about a given policy, either favorably or unfavorably, then changes in the level of information they receive can have important impacts on the government's effort level for that policy, *ceteris paribus*.[6]

iv) Overall policy costs and whether it is a complement or a substitute for those sought by the other principals (***C***) affect the success of an interest group. A group whose task is a substitute (complement) to other tasks of other groups will encounter negative (positive) incentives from the other groups. In the model the cost of each policy is common knowledge, preventing an interest group from trying to change perceptions of how the task affects the costs of others.[7]

III. Background: Land Reform in Brazil. [8]

Brazil has long had one of the most concentrated land ownership structures in the world. Approximately 45% of the agricultural land is held by the largest 1% of farm owners, and large tracts of this land are not used. The Gini coefficient of 0.85 in 1985 was the 9th

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precisely its ability to turn this violence to its own advantage by publicizing it to sympathetic voters who then press for more government action (Ondetti, 2006). In doing so the MST reduces the gains to landowners of engaging in violence and thereby reduces the level of violence. The Catholic Church also plays an important role in protecting the landless peasants from retaliation from landowners. See Alston and Mueller (2010) the role of the Catholic Church in land conflicts in Brazil.

[6] We later argue and provide evidence that the public "cares" about the landless. The same holds for the environment, especially if the costs to voters appear to be low.

[7] In principle, however, the model could be extended to include this additional information asymmetry.

[8] For greater details on land reform in Brazil see Mueller et al. (1994).

highest in the world (FAO/UN, 2004).[9] In terms of the size of the population affected, it is certainly among the most problematic cases with an estimated 4 million landless peasants.[10]

Concentrated land holdings grew out of the Brazilian colonial experience, and since the 19th century there have been repeated efforts by the central government to "substitute small holdings for latifundia" (Dean, 197, 624). But little of consequence has happened. The Gini coefficient has barely budged. In 1960 it was 0.84; in 1978, 0.85 and in 1998, 0.84. Very large farms of over 1,000 hectares also have continued to dominate land holdings. In 1940 1.5% of the farms held 48% of farmland; in 1960 1.0% held 44%; and in 1980 0.9% held 45%, and in 1996 1.1% held 45%.[11]

Despite this lack of action, the general electorate has long been sympathetic to the notion of land reform, a natural reaction given such salient inequality.[12] This broad constituency for land reform, however, is unorganized, heterogeneous and has only limited information regarding how much land reform is being carried out. Rural property owners have steadfastly opposed it.[13] Historically, they were well organized and provided support to politicians through contributions and votes. They were represented by several organizations, such as the Brazilian Rural Society (*Sociedade Brasileira Rural*) and especially by a large group of Congressmen from various parties, known as the 'rural bench' (*bancada rural*), that united to promote the interests of land owners and agricultural producers. As a result until 1993, the pattern was for politicians to call for aggressive land reform during electoral

[9] The ten highest Gini coefficients in the FAO dataset (www.fao.org/es/ess) are Barbados (0.94, 1989 data), Paraguay (0.93, 1991), Guam (0.88, 1987), Virigin Islands (0.87, 1987), Panama (0.87, 1990), Bahamas (0.87, 1994), Peru (0.86, 1994), Spain (0.86, 1989), Brazil (0.85, 1985), Argentina (0.83, 1988).

[10] This is the estimate typically given by the Landless Peasants Movement. The Lula government's II National Plan for Agrarian Reform (Ministério do Desenvolvimento Agrário, 2004) puts the demand for land reform at 3.1 million, or 5 million if one counts those who have land but in an insufficient amount. The Food and Agriculture Organization estimated the demand for land reform in Brazil at 2.5 million families in the mid-nineties (Romeiro et. al. 1994).

[11] Gini coefficients presented here are from the National Institute for Colonization and Agrarian Reform, INCRA (2001), which tries to deal with several of the methodological difficulties in the calculation of this index.

[12] We provide evidence to back this statement in Section IV.

[13] See Mueller (1998) for an incidence analysis on the groups affected by land reform, and econometric measurement of the impact of interest groups on land reform policy.

campaigns, and for little to be implemented once the election was over. So long as large landowners could deliver more support than could landless peasants, and so long as voters had little information on the actual state of land reform, politicians devoted few resources to it.

The pattern began to change when the MST (organized in 1985) took advantage of the new Constitution of 1988 that mandated the federal government to expropriate and redistribute unproductive properties. Complementary legislation was passed in 1993.[14] By the mid 1990s, the MST had honed its strategy of invading unproductive properties with elaborate press coverage to demonstrate the plight of the landless poor. This new public relations effort galvanized voters and spurred the government to act on land reform.[15] As the numbers of invasions multiplied, urban voters were reminded of the task at hand, and land reform moved to the forefront of political debate with more resources devoted to it. The MST has become regarded as one of the most successful grassroots movements in the world and is frequently held as a model of interest group effectiveness even though it lacks direct voting power and funds to contribute to politicians.[16]

IV. The Informational Role of the MST via Manipulation of the Media

IV.1. The Argument.

In order to understand the impact of the landless peasant movement it is useful to explore the implications of the model for land reform politics in Brazil with and without the MST by comparing the periods before and after the group became active throughout the country.

[14] Although the Land Statute of 1964 already provided the legal basis for expropriations, the new Constitution broadened the scope for the use of this instrument, made it easier to use and, most importantly, signaled the disposition of government and society that land reform should be pursued with high priority.
[15] For the history of the MST and an analysis of their organization, thinking and impact see Wright and Wolford (2003).
[16] Noam Chomsky was cited by the Economist (2004) as stating that the MST "…is the most exciting popular movement in the world today."

In the pre-MST period, there were two principals: landowners and urban voters.[17] The "task" for landowners was to either block expropriation or if some land reform were to occur, to lobby for additional action that benefited them as well, such as government credit and other subsidies. Both of these policies reduced the resources available for land reform.

The second group, urban voters, sympathized with land reform because of high levels of land and wealth concentration and aversion to general inequalities in the country.[18] But voters had little notion of the costs of land reform or of the government's efforts toward it.[19] Land reform was not a central preoccupation of urban voters, who were more concerned about unemployment, inflation, health, and crime. Consequently, they were rationally imperfectly informed about government land reform actions. Prior to the MST, voter information was based on government self reporting. With limited information to generate political pressure the government announced ambitious targets and set up a visible bureaucratic structure yet with little actual implementation.

With the MST, this changed. Sensational, highly-publicized media events--farm occupations, marches, invasions of governmental offices, roadblocks, and accusations that the government was stalling--caused voters to reassess the commitment of government towards land reform, and to call for more intervention. Politicians responded by increasing land reform.

IV.2. Evidence.

The relationship between MST invasions/occupations and concrete government efforts in terms of families settled on expropriated farms and government resources devoted to land distribution is shown in Graphs 1 and 2. They show that *circa* 1993 the MST became more

[17] The landless peasants and rural workers could also be considered principals, but because they lacked organization they had little power to affect government policy.
[18] Ondetti (2008) notes that land reform in Brazil is seen as a litmus test of a president's progressiveness.
[19] Expropriation for the purpose of land reform in Brazil is, by constitutional mandate, compensated at 'fair' value, though much of it in Titles of the Agrarian Debt, so that there are high costs for obtaining land as well as the expenditures to settle and maintain the beneficiary families. In 2004 the budget for INCRA, the federal land reform agency, was R$ 2.5 billion (approximately US$ 833 million. A study commissioned by the government and the FAO for the period of 2000-2005 found that the average direct cost of settling a family in a settlement project was US$12.272 (Marques, 2007).

active, increasing the number of invasions and occupations of private farms and public land (Graph 1). There were correspondingly larger budgets for land reform (Graph 2) and greater numbers of landless families settled (Graph 1).[20] The model specifies the channels through which this objective is achieved, highlighting the role of information asymmetries as well as interest group characteristics and preferences. The causal relationships link voters' preferences, MST action, the media, government, and land reform. These links are shown in Figure 1, with the upper line indicating where the insights from the model apply. We now present evidence of each link in the chain.

Link 1 - Voters care about land reform.

In the model this link is represented by the vector ***b***, a successful interest group pursues a task that is desired (or abhorred) by other key principals. This situation allows the group to generate support among the other principals by altering the information they receive regarding the government's actions (Ω). If the other principals are indifferent to the objective, information adjustments will have little payoff, and the group would do better by pressuring through another channel. In the case at hand, because voters care about land reform, MST has been able to extract more effort from the government through publicity.[21]

The high salience of land reform in Brazilian politics is not a new phenomenon. It has been a central political issue since the 1960s and remains so today despite currently high levels

[20] Heredia et al. (2002), in a large sample of settlement projects, found that 96% of settlement projects emerge from some form of conflict rather than government initiative. They also show that although there are several other groups, the MST is by far the most active. The drop in occupations and settlements after 1999 can be attributed to several factors. By that time so many families had been settled that the MST's main focus shifted to pressuring the government to make good on its pledges of credit to those families rather than obtaining more land for new families. This is important for the MST as it receives 1-4 % of all the credit provided to settled families. Also, in 1999 the economy passed through a severe crisis involving a large devaluation of the *real*. In the following years the government successfully dealt with this crisis by pursuing strict fiscal restraint (Alston, Melo, Mueller and Pereira, 2006), which severely constrained the governments land reform effort. Finally, in the year before the 2002 presidential election, the MST purposefully reduced the number of invasions so as not to harm the electoral chances of Lula, who they preferred to the more conservative candidate.

[21] An alternative hypothesis for why so much land has been redistributed in the past decades could be that the President pursues land reform as a matter of public interest or ideology rather than for Downsian motives. We will show in this and the following subsections that the full set of the evidence fits our hypothesis better than alternative hypotheses.

of urbanization, coming to symbolize more than the mere redistribution of land. Several public opinion polls have been conducted over time to gauge society's position towards land reform. Almeida (1998) reviews eight opinion polls from 1962 to 1998 and shows that there has consistently been broad support towards land reform. In 1998, for example, a poll conducted by IBOPE revealed that 80% of those interviewed were "in favor of land reform." A survey in 2006 asked respondents which reform the government should address first (Fundação Perseu Abramo, 2006). When the question was left open-ended, land reform was at the top of the list, When a list of reforms was proposed land reform fell below labor, social security, fiscal and political reform, but was nevertheless still chosen by 45% of respondents as one of the top three priorities.

It is important to make a distinction between the sympathy of voters for land reform and their view of the MST. During most of the period we are analyzing the distinction between the MST and land reform was often blurred to the general public with the sympathy for land reform rubbing off on those who were helping to promote it. The group's popularity gained a boost from two highly visible confrontations in 1995 in Corumbiara in the state of Rondonia and in 1996 in Eldorado dos Carajas in the state of Pará, where several landless peasants were killed. These events gave the MST national and international exposure and pushed land reform to the center of political debate. As noted by the *Economist* (1997), the MST "won the ultimate accolade: sympathetic portrayal in a prime-time soap opera on Globo, Brazil's leading television station." Ondetti (2008) explains that "(s)ince telenovelas are a national entertainment institution on a par with soccer, this was the ultimate form of cultural recognition of the salience of the land question to the Brazilian public."

More recently the approval of the MST has started to decouple from that of land reform. By 2006 the landless issue may not have seemed as pressing as it had once been given that an area greater than France and Portugal together had been redistributed. An opinion poll

by Ibope (2006) showed that 56 percent of Brazilians thought the MST brings more negative than positive results to land reform and 53 percent think the government should use the police to evict the MST from evaded farms. With fewer unproductive farms left to occupy, the MST has taken to invading productive properties, denting their image with much of the Brazilian electorate.

We note that our argument does not require the approval of voters of the actions of the MST and invasions of private farms. All that is required is that: 1) the MST is continually able to elicit media coverage; 2) voters approve of land reform; and 3) the MST's actions impart information to voters on the government's efforts towards land reform. During most of the period we are dealing with in this paper, including in the regression analysis below, not only land reform, but also the MST were well seen by the electorate. The analysis in this paper refers to the period up to 2007 and may be less suited for the subsequent period.[22]

Link 2 – MST action: occupations, invasions, marches.

Graph 1 shows the number of occupations by the MST and settlement projects created by the government. The data show that after 1993 the number of occupations and the number of settlement projects started rising, marking a clear break with the past. Graph 2 shows that government expenditures rose simultaneously with conflicts and settlement projects. Together the data in Graphs 1 and 2 are consistent with our story of greater action by the MST leading to responses by the government in the form of greater expenditures on land reform and settlement projects.

We perform Granger causality tests to see if the data are compatible with causation from MST action to government reaction. Table 1 panel A shows the descriptive statistics for

[22] With the large number of landless peasants that have been settled and given land in the past fifteen years, the stock of actual landless peasants, that is, those that really have aptitude to work the land rather than simply being poor, has fallen and it may become harder for the MST to recruit in the future. Graziano (2004) argues that there are no longer any "true" landless in Brazil and that current MST occupations are filled mostly with poor, unemployed people living in bad conditions in the cities. Similarly, the stock of unproductive land available for expropriation has plummeted, not only because of the scale of past land reform, but also because of the rise of commodity prices since 2003 and the rise of biofuels.

the data and Table 2 show the tests. Unfortunately these data are only available annually, from 1989 to 2005 so there are only 17 observations, thus results are only suggestive. Because unit root tests have low power with small samples we choose to do the causality tests both in levels and in first differences and then compare the results. The tests are run both between each pair of variables as well as conditionally, adding lags of the third variable on the right-hand side. The results show an intimate relationship between occupations, expenditures and settlements. In addition the results show that greater effort by the government (expenditures) encourages the MST to pursue even more occupations.[23]

One of MST's strengths is that it has low labor costs ($G^{i}_{e_j}$), enabling a strategy of influence that is labor intensive. Most MST members are extremely poor with few alternatives and are motivated by the opportunity for land.[24] The invasion and occupation of a farm and turning it into a land reform settlement require that large contingents of people are mobilized for long periods of time. Between 30 to 500 people wait near a property for the right time to act. The invasion may occur peacefully or involve violent conflict.[25] If there are evictions, the group will return to a provisional camp to reinvade the same property or start over elsewhere. Years can go by before progress is made. To maintain order the MST imposes strict discipline in its camps to overcome free-riding, a necessary element in interest group success (Olson, 1965 and Stigler, 1971).

[23] This result is consistent with Alston, Libecap and Mueller (1999a, 2000). The results hold for both levels and first differences, reducing concerns of spurious correlation, especially in the light of all the other qualitative evidence we present about the nature of Brazilian land reform.

[24] In this regard Wright and Wolford (2003: 54) cite a settler's recollection of his days in an MST occupation: "We lost what little we had when we went to the encampment. We could take little even of those few things that we owned into the new encampment, the only thing we took was our (wood-burning) cook stove. What little savings we had were soon gone, because we were earning nothing. We had no house nor land to return to, no household goods, hardly any clothing, very few of our tools – everything was lost. And there was no way to go back and be the same person again to the old neighbors, the friends on the outside." In other passages the authors also document several positive memories that settlers held from the occupation days, in particular the camaraderie and the sense of empowerment from participating in the movement.

[25] From 1985 to 2003 there were 13,524 conflicts for land in Brazil, most of which involved an invasion and the subsequent resistance to eviction (Comissão Pastoral da Terra, 2004). The number of conflicts follows closely the number of occupations in Graph 1.

As noted by Becker (1983) what matters in competition between interest groups is relative political pressure. In the competition for the attention of voters via the media, landowners are at a considerable disadvantage despite having financial resources because they have high opportunity costs and the public is not particularly sensitive to their interests.

Link 3 –The Media covers MST actions.

There is competition for media coverage, yet the MST has continually proved to be a master in public relations, creating newsworthy situations as part of its strategy. These include invading farms belonging to high profile figures, such as ex-President Cardoso (invaded in 2002) or mega-investor Daniel Dantas (2009), even while knowing that those properties were productive and could not be legally expropriated; staging marches by landless peasants across the country; blocking roads and occupying entering government offices; and having charismatic leaders make bombastic statements to the press.

Ondetti (2008) provides evidence that these actions by the MST have actually kept the land reform issue continually in the media. He quantified the volume of coverage of land reform by a the country's major weekly magazine (*Veja*) and by a major newspaper (*Folha de São Paulo*) from the early 1990s to the mid 2000s and shows that although there is variation over time, reflecting specific events such as the massacres and the marches, the issue has remained in the public eye throughout the period.

There is also evidence that this volume of coverage is not coincidental or an unintended side effect of the MST's action, but rather has been purposefully sought as a means to pursue their objective. There is quite a sizeable literature dedicated to studying the relationship between the MST and the media, often in the journalism and communications area (Berger, 1998; Vargas, 2006; Melo, 2007; Cruz and Varela, 2009; see several additional citations in Hammond, 2004). Berger (1998) discusses a MST document from 1995 called 'For an MST Communication Policy' where the need to engage directly with the media is explicitly

recognized. In Vargas (2006) the author spent a week in the MST's communication office in Brasilia and accompanied its efforts to get the movement's actions covered by the press. During that week the MST was promoting its yearly 'red April' event when the MST increases the number of occupations in remembrance of the massacre in April of 1996. She interviewed not only the MST but also the reporters of major newspapers and concluded that the MST was highly successful in putting the issue on the media's agenda, though only partly successful in influencing the interpretation or reading given by the media to the events they were covering. Hammond (2004) has similarly found that the MST has been successful in attracting media coverage. He analyzes the content of the media's portrayal of the MST and concludes that "the treatment of the MST in the Brazilian media is diverse, presenting a mixture of sympathy and hostility" (Hammond, 2004:83).

The issue of the treatment given by the media to land reform brings up the question of the preferences and incentives faced by the media. We have treated the media as being a neutral player that simply passes on the information created by the MST to the general public. But clearly the media can have its own interests both related to land reform and to other governmental policies, so it could be modeled as another principal in the game.[26] Especially at the local level landowning interests coincide with ownership of the media. We choose, nevertheless, to not explicitly model the media as a principal. Although there is considerable concentration in television and the printed press it is not so high that a single view prevails and significant competition exists in terms of points of view. Also the quality of most Brazilian media is high compared to world standards with good levels of objectivity and independence. As noted in much of the literature cited above, the MST and land reform have gotten fair and often sympathetic portrayals (Hammond, 2004; Berger, 1998; Vargas, 2006; Gohn, 2000), though the movement and other analysts would not agree. Similarly there does not appear to be

[26] See Besley, Burgess and Prat (2002) and Besley and Burgess (2001) for analyses of the motivations and impacts of the media on policy responsiveness to preferences of voters.

underreporting of the issue, in great extent thanks to the explicit efforts of the MST for coverage. Therefore it is a reasonable simplification to treat the media as exogenous.

Link 4 – The voters are informed by the media.

The productivity of effort in influencing information ($\frac{\partial \omega_{jj}(e_j^i, e_j^{-i})}{\partial e_j^i}$) requires both attracting media attention and changing the perceptions of voters. The evidence we have presented indicates that voters demand land reform, the MST ingeniously create newsworthy content that the media, which has to compete for audience, systematically chooses to keep broadcasting. One would not expect these actions to persist if voters were simply ignoring what the media transmits about land reform. The main message received by voters is not so much whether the MST is good or evil, but instead that the government isn't moving forward with land reform, information which is filtered into their subsequent electoral decisions, as we show in the next link.

Link 5 – The President is pressured by the voters for more land reform.

To empirically support this argument, we estimate a model of presidential popularity, adding to the usual specification of economic and political explanatory variables other variables that measure farm occupations by the MST. The idea is to show that voters not only care about land reform, but effectively send the message through to the President. If we find that more MST occupations reduce the President's popularity, this will be evidence of the MST's effectiveness in manipulating perceptions of voters to indirectly force the government to increase land reform, after all popularity is a politician's compass of what to do to assure political survival. A negative impact of occupations on presidential popularity could also be interpreted as punishment by the voters for the President being soft on the MST and not stopping them from breaking the law and disrespecting property rights. If this were the case one would expect Presidents and presidential candidates to frequently adopt a hard-line against

the MST in their actions and rhetoric so as to capitalize on this supposed sentiment of voters. But what we see is the opposite. Whenever tensions flare up in land-related confrontations the President typically reacts by promising more land, more credit and more effort. The voters' default is to always assume that politicians are evading the promise to redistribute land, for this has historically been the case, and the presidents' reflex is to reiterate the promise and up the ante whenever events cast a doubt on their resolve. An example took place in May 2005 when the MST organized a march of 12,000 landless peasants from different parts of the country that met in Brasilia where they held a large demonstration. Instead of ignoring or repressing the event President Lula received the protesters in the governmental palace, as Cardoso had done in the 1997 march. Lula turned the event into a photo op and promised: 1) to send a presidential decree to Congress by the end of the month to provide an additional R$ 700 million for settlement projects; 2) to hire 1,300 new staff members for INCRA, the land reform institute; and 3) to tighten the criteria which determines how productive farms have to be so that they are immune from expropriation (Estado de São Paulo, May 17, 2005; The *Economist*, May 19, 2005). Similarly in April 2004 the movement announced an intensification of its occupations to greet the new Lula administration. MST leaders spun this as an effort to create a "red April," a play of words on the red of the MST flag and the possibility that blood would be spilled. The government reacted to this threat not by rebuking the MST, but by expropriating 34 farms in April, significantly more than average (Ornaghi, 2004). It is therefore safe to interpret a negative impact of occupations on popularity as a punishment for not doing enough land reform.

There is a large literature testing the determinants of presidential popularity by regressing opinion poll data against a series of variables that capture the state of the economy and political events (Price and Sanders, 1993; Edwards, 1991; Erikson, 1989; Markus, 1988; Monroe, 1984, Mueller, 1973). Our dependant variable is the percentage of the electorate that

finds the President's performance 'very good / good' in periodic public opinion polls performed by Datafolha Insituto de Pesquisas.[27] As explanatory variables we use: monthly data on inflation; interest rates; exchange rates; GDP growth in the last 12 months; unemployment; and lagged popularity, the latter variable to control for the inertial aspect of popularity and thus avoid problems with autocorrelation.[28]

In addition to these economic variables we added controls for political and social events that may have an impact on popularity. The first of these is a dummy indicating months when President Lula was in office (January 2003 onwards) with President Cardoso's terms in office as the baseline. Another dummy controls for the 'Mensalão' scandal (June to December 2005), where President Lula was accused of purchasing votes in Congress. Given the importance of soccer in Brazil and the perception that success can have economic and political consequences (Falter, Pérignon and Vercruysse, 2008; Ashton, Gerrard and Hudson, 2003), we added dummies for the World Cups of 1998, 2002 and 2006 (months of June, July and August).[29]

The key to this test is to add to the list of economic, social, and political variables a measure of the MST's efforts at calling attention to land reform. If this measure reduces the President's popularity *ceteris paribus*, we will have found evidence for our hypothesis that the MST impacts the government by increasing voters' awareness of the issue. We use two measures of the MST's efforts. The first is the number of occupations promoted by the MST and other landless groups lagged for three months. Occupations are the main instrument used by the landless to pressure for land reform and typically yield high visibility in the media. The second variable is a dummy for the 'red April' months (see Graph 3). These are the months in

[27] Our period of analysis is January 1997 to December 2007. The initial date is constrained by the availability of monthly data on land occupations (www.cpt.org.br) There are data on Presidential approval rates for most months in the period. When no poll was performed that month, we repeat the value of the previous month. Using only 'very good ' as dependant variable yields similar results.
[28] Using a measure of income instead of GDP growth gave similar results.
[29] In 1998 Brazil finished in second place, in 2002 Brazil was the world champion and in 2006 it did not reach the semi-finals.

which the MST increases its publicity campaigns as a tribute to the past massacres.[30] If this dummy variable detects a fall in Presidential popularity in the subsequent month (May) of each year, this result is consistent with our hypothesis that the MST, through the media affects the popularity of the President. Graph 3 shows the presidential popularity and the occupation data from January 1997 to December 2007, highlighting the 'red Aprils' and the terms of Cardoso and Lula.

Because we are using time-series data we have to ascertain whether the variables are stationary before regressing them, at the risk of interpreting spurious correlations as meaningful relationships. Descriptive statistics are in Table 1 Panel B. In Table 3 we present augmented Dickey-Fuller tests for unit roots for all the continuous variables, specifying the number of lags, sample size and use of a trend. The second column shows that the null hypothesis of a unit root is not rejected for all variables at a confidence level of 1%, though it is rejected for inflation at 5%. In the last column we show the ADF tests after first differencing the data. For all variables in first-differences the null hypothesis of a unit root is rejected. These results together suggest that all variables are *I(1)* and do not come from stationary processes, so that our regression will only make sense if the variables are found to be cointegrated, which will be tested. Typically unit root tests do not provide a definitive assessment of the order of integration, so we will also run the regression on first-differenced data that is stationary and can be consistently estimated by OLS.

We present results in Table 4. In Columns I, II and III we show the results for data in levels under different specifications to test the robustness of the results. In all three specifications the regression is run using OLS and the residual is tested for cointegration. Given that all variables are assumed to be *I(1)*, if the residual is found to be *I(0)* the results can be taken as meaningful rather than spurious and can be interpreted as the long-term relationship

[30] Activities include coordinated mass occupations throughout the country, marches, festivals, and interviews, with special care to elicit media attention (Vargas, 2006).

among the variables. In all three specifications the residual is tested with a Phillips-Perron test and an augmented Dickey-Fuller test using the appropriate more stringent critical values (see bottom of Table 2). In addition a Johansen cointegration test is performed to test the null of no cointegration. The test statistics and appropriate critical values are presented in the bottom of Table 2. All the tests reject the hypothesis of no cointegration, indicating that there is a non-spurious relationship between presidential popularity and the determinants we specify.

The first column shows that lagged popularity has a coefficient slightly below 1 and is highly significant, indicating that popularity tends to have high inertia. Of the economic variables GDP growth and interest rates have a positive and significant effect on popularity, while unemployment, as expected, has a negative and significant impact. Exchange rate and inflation are found to have negative, but not statistically significant coefficients. The political variables also have the expected effects. The results show that Lula *ceteris paribus* had higher levels of popularity than Cardoso and that the *Mensalão* corruption scandal did dent that popularity. World Cups are found to have boosted the President's approval rates, but only the 1998 cup is statistically significant.[31]

The key results are the effect of occupations and the 'red April' dummy on popularity. The estimated coefficient for occupations is negative and significant at the 1% confidence level. The impact of a one standard deviation increase in occupations in previous months is to reduce the president's popularity by 1.4% when all variables are set at their means with dummies equal to zero except the Lula dummy. This comes from a fall in approval ratings from 35.2% to 33.8%. This impact is slightly larger than the impact of a one standard deviation increase of the other

[31] A possible interpretation of this result is that the Brazilian electorate matured as democracy consolidated and was less and less influenced by such politically peripheral issues. Note that Brazil was second in 1998, won the Cup in 2002 and was fifth in 2006.

economic variables: GDP 1.2%; exchange rate -0.9%; inflation -0.9%; interest rates 1.0% and unemployment -0.9%.[32]

The 'red April' dummy also provides evidence that MST activity reduces presidential popularity. There is a statistically significant (10%) drop in popularity every year on the month after the wave of MST demonstrations. With all the variables at their means (dummies=0 , Lula=1) approval ratings fall 1.7%, from 35.2% to 33.5%. The adjusted R-squared for this regression is 0.93. This high value is partly due to the lagged popularity on the left-hand side, but even without this auto-regressive term the adjusted R-squared was still 0.70.

In column II we estimate a specification where the only economic variable is GDP growth. The reason for this exercise is that the economic variables are naturally interdependent, which may raise concerns over multicollinearity, even though the correlations are all under 0.52. The estimated coefficients of the occupation and 'red April' still retain their significant impact on popularity.

In column III we test whether the impact of occupations vary in the Cardoso and the Lula administrations. This is done by adding an interaction term of the Lula dummy and the occupation variable. Because Lula is supposedly more ideologically aligned with land reform and the MST, one might expect occupations to be a more effective instrument with him. The results show that the opposite is true. For the Cardoso administration the elasticity of popularity with respect to occupations is -0.076 and for Lula it is considerably lower, -0.029, both statistically significant at 1%. A possible explanation is that Lula's left-wing credentials are sufficiently strong to neutralize publicity about occupations. A possibly complementary explanation is that the publics' view on land reform and the MST has gradually changed over time, becoming less sensitive to the information conveyed through the occupations. If this is

[32]Comparing the economic variables and occupations in logarithms so that the estimated coefficient is a measure of the elasticity of popularity with respect to those variables, we find that the impact of occupations is somewhat lower: occupations -0.056, exchange rate -0.077, interest rate 0.101 and unemployment -0.267.

true, the land reform game modeled in this paper may eventually change into another form of interaction.

In column IV we estimate the model after first-differencing the data so as to assure stationarity. This adjustment loses some information in variables, but is done as a robustness check on the results, given the possibility of Type I error when determining stationarity due to the low power of the unit root tests. The main results still hold in this specification with occupations retaining a negative and significant (at 10%) impact on Presidential popularity. The 'red April' effect becomes stronger and more significant. The results involving the economic and political variables remain very similar to those found earlier in levels, although the adjusted R-squared falls to 0.19.

The final test, shown in column V, is an error correction model that allows us to investigate the short-term dynamics through which adjustments are made between popularity and its determinants (Engle and Granger, 1987). This is done by adding the estimated lagged residual from the cointegrated estimation in column 1 as a regressor in the first-differenced, and thus stationary, specification in column IV. The estimated coefficient of the lagged residual measures how quickly popularity changes to correct deviations from its long-term equilibrium. As it must be, the estimated error correction term is negative and statistically significant at 1%. The value of -0.294 indicates that on average each month 29% of the difference between observed and predicted popularity is corrected. Because these are monthly data this is a reasonably high speed of adjustment and indicates that the electorate is attentive to current events and reacts to new information when responding to popularity surveys. One expects that successful politicians would are aware of this characteristic of voters and react accordingly.

Link 6 – The government increases its land reform effort.

As shown in Graph 1 and 2 expenditures for land reform and settlement projects increased dramatically after MST became active. Table 2 reveals evidence of causality from occupations to expenditures. President Cardoso redistributed over 2.6 million hectares of land per year on average from 1994 to 2002 settling on average over 51 thousand families per year (Ondetti, 2008). This was more than all other previous governments together had accomplished. Lula followed suit and redistributed 8.1 million hectares to 57 thousand families per annum on average from 2003 to 2006. In 2010 there are more than 900,000 families in settlement projects.

Link 7 – Increased land reform results from efforts of the Government.

From all that was shown above it would seem that the MST has increased social welfare, as its efforts lead society gets more of what it wants. However, permanent redistribution may not be occurring. The game modeled and tested above implicitly assumed that the number of settled families annually is a good measure of land reform. This is the metric in which the land reform debate has been cast in Brazil. Given such incentives it should be no surprise that most effort is expended on this margin while other margins that are left out of the debate receive much less weight, a standard result from multi-task principal-agent models (Holmstrom and Milgrom, 1991).

The most important neglected margin is effort to ensure that a settled family develops a productive farm. In most cases this does not happen. Only a small minority of government settlement projects are ever successfully removed from subsidies and productivity levels remain low (Sparovek, 2003: 111; Abramovay, 2005; Graziano, 2004).[33] Once a family has

[33] In a paper that analyzes the level of turnover and reconcentration in settlement projects Ludwiges et al. (2009: 1357) conclude that "qualitative results, such as the number of settled families who ultimately stay on the lots, and are economically successful, are not fully considered, compromising the *de facto* redistributive goals of land reform programs in Brazil."

been given land and has been counted towards the target, there are few incentives to follow through with training and other support to help it succeed.[34]

Accordingly, despite the MST's intervention and voter response, it seems likely that voter preferences are not being met.[35] Much less permanent land redistribution takes place than is indicated by the number of families settled. This information is not generated by MST. At the same time the cost of each settled family is surprisingly high. A study commissioned by the Food and Agriculture Organization together with the Brazilian government found an average cost of US$12,272 per settled family from 2000-2005, with the average in some regions reaching US$33,329 (Marques, 2007).[36] If one considers other indirect costs, this number increases. One important consideration is the environmental impact of creating settlement projects in the Amazon (Sparovek, 2003: 127). It is estimated that 15% of the deforestation in the Amazon is directly due to land reform settlement projects (Freitas and Arini, 2007). Our overall evidence indicates that although links 1 to 6 effectively connect, the connection to the seventh link is not so clear.

V. Concluding Remarks

When interest groups compete for influence in the presence of asymmetric information, two factors reduce the power of their inducements for politicians. One is that many of their actions cancel out. Second, information asymmetries about actual effort gives rise to moral hazard and allow politicians to skimp on effort. In this paper we show that a third factor can influence equilibrium levels of effort when groups manipulate media information to voters about policy actions, thereby potentially reducing (or distorting) the information asymmetry.

[34] França and Sparovek (2003: 37-38) surveyed over 4000 settlement projects and found that although the number of settled families is high, "aspects such as quality of life, economic development of the projects, environmental impacts, regional benefits and benefits to the local communities outside the projects, take a secondary role under this form of evaluating performance."

[35] See Abramovay (2005) for a study that reaches the same conclusion.

[36] This issue is related to the fourth characteristic of an interest group that works through information in our model (variable ***C***, see figure 1 top line). The fact that the cost of land reform is generally perceived as being low to taxpayers leads to a greater demand for land reform than would materialize if the true social cost were transparent.

Interest groups have an incentive to mold information in their behalf. Our multi-principal multi-task model reveals the characteristics of groups that are likely to be successful in this activity, even if they lack financial resources and voter participation

We use the model to analyze the actions of the Landless Peasants Movement (MST) in Brazil in galvanizing urban voter support for rural land redistribution by orchestrating events that have high media appeal. As noted, the MST has little financial resources or a large voting bloc. By molding the information available to urban voters in a manner not possible to the competing interest (land owners), the MST can generate broad urban support for its land reform agenda.

This model of interest group behavior is general to any interest group that has the sympathy of the public at large and a comparatively low-cost means of generating that interest. Environmental groups often pursue their interest not by engaging directly with policymakers but by providing the public with information that leads society to increased social pressure for their causes. The theatrical stunts performed by Greenpeace are effective not because they sensitize the policy makers but because they persuade the public to demand those policies from politicians.

Another example is the principal-agent problem that central authorities have in enforcing their directives locally in China. It has been suggested that in order to harness bottom-up monitoring of local officials, the central authorities have tolerated local protest and introduced limited levels of freedom for local media (Minzer, 2009: 82). The protests reverberate through the media and reduce the information advantage that local administrators had over those in Beijing. In the same manner Ferraz and Finan (2008) analyze the electoral impact of audit reports by the federal government and find that corruption in municipal administrations in Brazil was highly dependent on the existence of a radio station to disclose information about audit reports to voters. In all of these examples an interested party is able to

change the behavior of a delegated agent, not by direct intervention but by indirectly changing the size of the information asymmetry.

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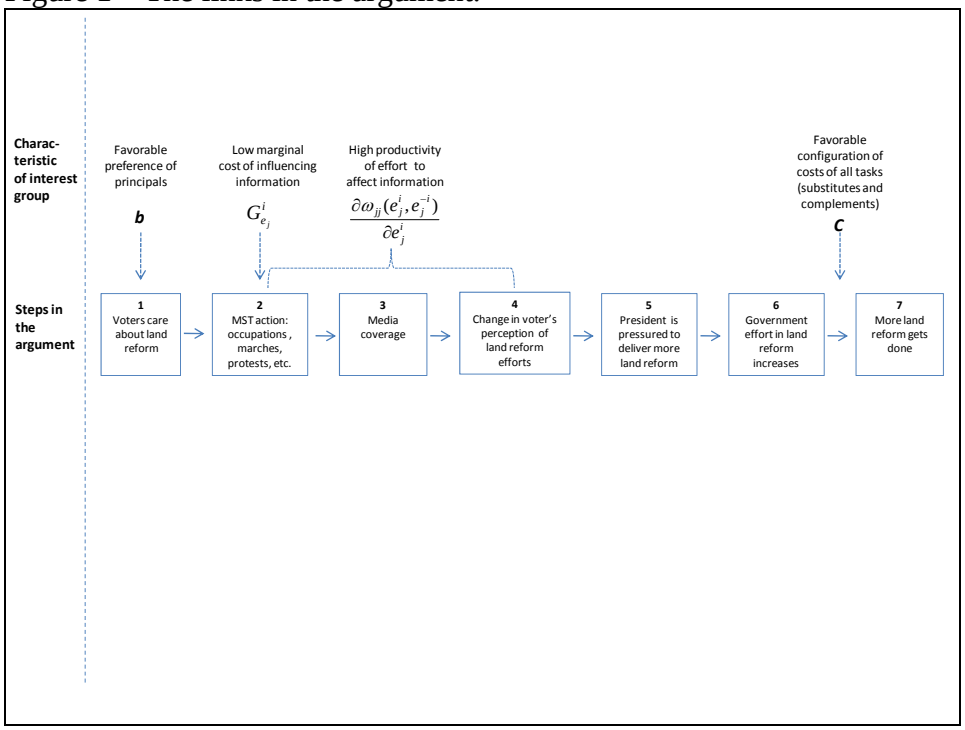
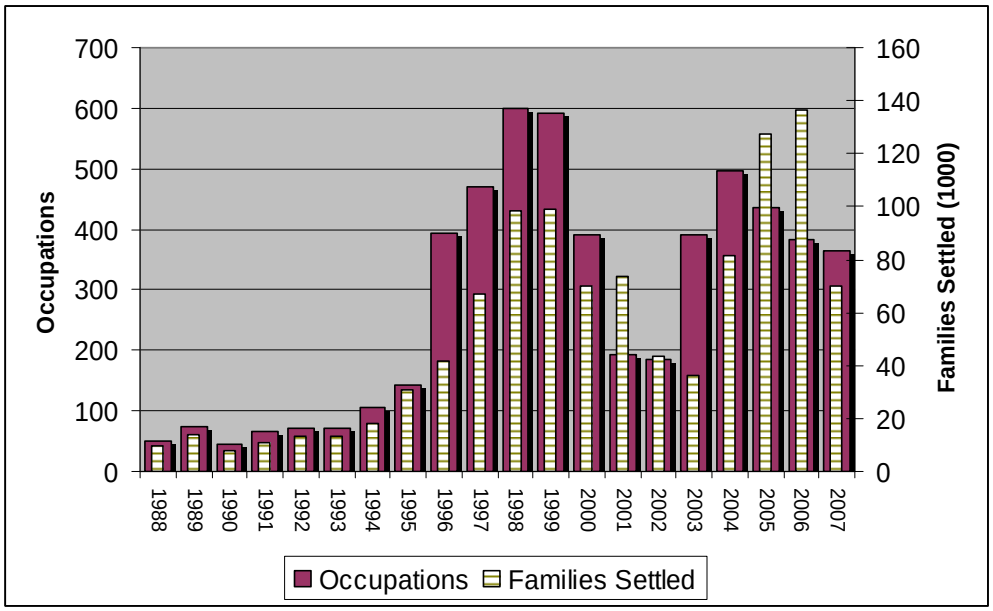
Figure 1 – The links in the argument.

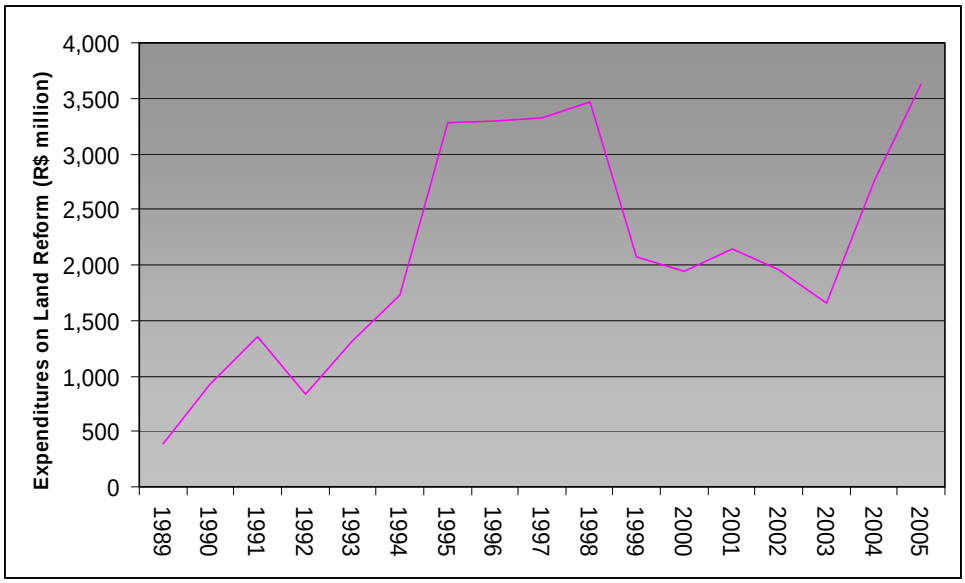


Graph 1 – MST Action (Occupations) and Government Reaction (Settled Families)



Source: Ministério do Desenvovlvimento Agrário (2004: 20), MDA/INCRA Balanço de 2007 (2008). Comissão Pastoral da Terra (2004:13) and other yearly publications. Note: Data for number of families settled from 1988 to 1994 is the average for each government; Sarney (1988-89), Collor (1990-91), Franco (1992-94).

Graph 2 – Expenditures on Land Reform and Agrarian Organization.



Source: Gasques et al. (2006). Constant R$ for 2005.

Table 1 – Descriptive statistics.

Panel A – Yearly Data					
Variable	***N***	***Mean***	***Std. Dev.***	***Min.***	***Max.***
Occupations	17	277.76	200.38	44	599
Settlements	17	49.8	37.10	8	127.5
Expenditures	17	2122.24	1013.85	392	3628
		Panel B – Monthly Data			
Variable	***N***	***Mean***	***Std. Dev.***	***Min.***	***Max.***
Popularity	134	34.46	10.97	13	52
Occupations	134	33.27	23.47	2	137
Inflation	134	0.77	0.94	-0.79	5.84
Exchange rate	134	2.15	0.68	1.04	3.81
Δ GDP	134	0.11	0.04	-0.01	0.24
Interest rate	134	1.51	0.46	0.80	3.34
Unemployment	134	11.22	1.10	8.9	13.6
Lula	135	0.467	0.501	0	1
Red April	134	0.083	0.277	0	1

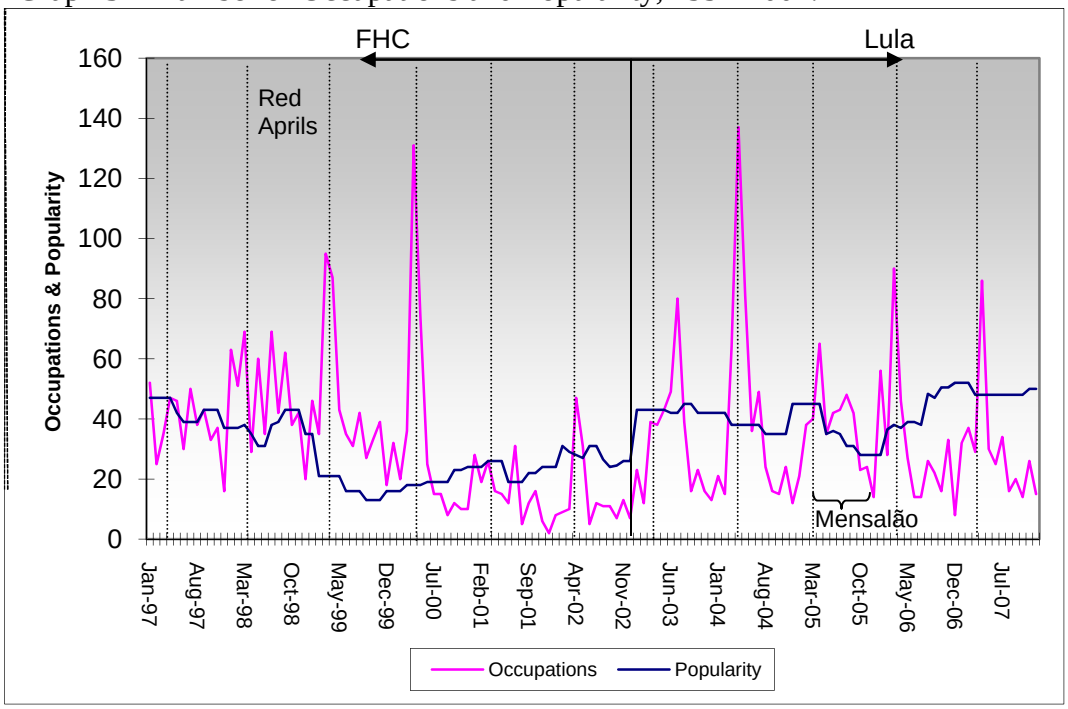
Popularity data is from Datafolha (http://datafolha.folha.uol.com.br/). Occupation data from Comissão Pastoral da Terra (http://www.cptnac.com.br/). Settlement data from Ministério do Desenvovlvimento Agrário (2004: 20), MDA/INCRA Balanço de 2007 (2008).

Table 2 – Relationship Between Occupations, Settlements and Expenditures

Equation (Y)	Excluded (X)	χ^2	df	prob.>χ^2
		Levels		
Occupations	Settlements	0.78	1	0.3780
Occupations	Expenditures	19.43***	1	0.0000
Occupations	All	19.97***	2	0.0000
Expenditures	Occupations	4.84**	1	0.0278
Expenditures	Settlements	1.39	1	0.2393
Expenditures	All	6.60**	2	0.0369
Settlements	Occupations	4.41**	1	0.0358
Settlements	Expenditures	19.66***	1	0.0000
Settlements	All	19.81***	2	0.0000
		First Difference		
Occupations	Settlements	1.62	2	0.4449
Occupations	Expenditures	8.46**	2	0.0145
Occupations	All	8.93*	4	0.0630
Expenditures	Occupations	9.27***	2	0.0097
Expenditures	Settlements	13.23***	2	0.0013
Expenditures	All	14.30***	4	0.0064
Settlements	Occupations	129.00***	2	0.0000
Settlements	Expenditures	20.49***	2	0.0000
Settlements	All	133.13***	4	0.0000

H_o:X does not cause Y. *** 1%, **5%, and * 10%. In levels: N=14, lags=3, R^2 for, respectively, Occupations, Settlements and Expenditures vector autoregresstions are 0.91, 0.93 and 0.61. In first differences: N=13, lags=2, R^2 for Occupations, Settlements and Expenditures vector autoregresstions are 0.59, 0.93, 0.51.

Graph 3 – Number of Occupations and Popularity, 1997-2007.



Source: Popularity is the % interviewed classifying the President's performance as 'good' or 'very good' Datafolha (2002). Occupation data from Comissão Pastoral da Terra (several years).

Table 3 – Testing for Unit Roots.

Variable	*Trend, Lags, Sample size*	*ADF test Levels*	*ADF test First Difference*
Popularity	T, L=3, N=130	-2.625	-5.273***
Occupations	T, L=5, N=126	-2.935	-6.874***
Exchange rate	T, L=3, N=130	-0.635	-5.074***
Inflation	T, L=3, N=130	-3.881**	-6.642***
GDP growth	T, L=4, N=129	-2.945	-7.377***
Interest rate	T, L=4, N=129	-2.901	-5.534***
Unemployment	T, L=3, N=130	-2.209	-5.591***

H_o: presence of a unit root, H_1: reject unit root. Critical values for ADF: 1% = - 4.030, 5% = -3.446, 10% = -3.146. *** reject H_0 at 1%, ** reject H_0 at 5%. * reject H_0 at 10%. All continuous variables are in logs except GDP growth and inflation that have negative values.

Table 4 – Presidential Popularity and Land Reform.

Dependant Variable: **Popularity$_t$**	**I** **Levels**	**II** **Levels**	**III** **Levels**	**IV** **First Difference**	**V** **ECM**
Popularity$_{t-1}$	0.821***	0.903***	0.816***		
	(16.38)	(24.10)	(18.92)		
Occupations$_{t-3}$	-0.056***	-0.042***	-0.076***	-0.047***	-0.026**
	(-3.15)	(-2.85)	(-3.22)	(-2.88)	(-2.06)
Occupations$_{t-3}$ x Lula			0.047***		
			(2.67)		
ΔGDP$_t$	0.737***	0.263	0.743***	0.592**	0.588*
	(3.07)	(1.25)	(3.06)	(2.58)	(1.97)
Exchange Rate $_{t-1}$	-0.077		-0.097	-0.273	-0.585*
	(-1.24)		(-1.45)	(-1.00)	(-1.92)
Inflation$_t$	-0.029		-0.026	-0.025	-0.036**
	(-1.32)		(-1.18)	(-1.58)	(-2.21)
Interest $_t$	0.101*		0.118*	0.052	0.059
	(1.82)		(1.95)	(0.86)	(0.98)
Unemployment$_t$	-0.267**		-0.287**	-0.445*	-0326
	(-2.12)		(-2.10)	(-1.82)	(-1.36)
Lula	0.139**	0.070**		-0.03	0.014
	(2.34)	(2.26)		(-0.16)	(0.72)
Red April Effect	-0.050*	-0.045*	-0.048*	-0.086***	-0.080***
	(-1.78)	(-1.86)	(-1.68)	(-2.85)	(-2.63)
Corruption Scandal *Mensalão*	-0.091**	-0.049*	-0.137***	-0.047*	-0.075***
	(-2.24)	(-1.72)	(3.23)	(-1.70)	(-2.89)
World Cup 1998	0.168***	0.154***	0.178***	0.112**	0.083***
	(3.63)	(3.01)	(3.91)	(2.56)	(3.01)
World Cup 2002	0.071	0.001	0.078	-0.008	0.062
	(1.31)	(0.02)	(1.56)	(-0.016)	(0.85)
World Cup 2006	0.080	0.079	0.062	0.088	0.047
	(1.40)	(1.22)	(1.02)	(1.62)	(0.78)
Lagged residual from model I					-0.294***
					(-3.00)
Constant	1.349***	0.414***	1.481***	0.118**	0.002
	(3.76)	(2.96)	(3.84)	(2.01)	(0.14)
N	129	129	129	129	128
R^2	0.944	0.932	0.945	0.269	0.292
Adj. R^2	0.939	0.923	0.938	0.193	0.211
Prob(F-stat)	0.0000	0.0000	0.0000	0.024	0.0016
Phillips-Perron test	Z_ρ = -145.76***	Z_ρ = -137.676***	Z_ρ = -142.37***		
H_0: no cointegration	Crit. Value = -74.89	Crit. Val= -64.25	Crit. Value= -74.89		
	Z_t = -12.29***	Z_t = -12.10***	Z_t = -12.24***		
	Crit. Value = -7.27	Crit. Value= -6.55	Crit. Value =-7.27		
Aug. Dickey-Fuller test	Z_t=-7.816***	Z_t=-7.882***	Z_t=-8.062***		
H_0: no cointegration	Crit. Value = -7.27	Crit. Value= -6.55	Crit. Value = -7.27		
Johansen Cointegration Test					
H_0: no cointegration					
Max-lambda statistic	136.22***	96.48***	147.05***		
rank=1	73.73	49.51	79.23		
Critical value (99%)					
Trace statistic	363.41***	180.04***	445.01***		
Critical value (99%)	279.07	124.75	327.45		

Notes: t-stats in parentheses. 1 % ***, 5 % **, 10 %*. All continuous variables in logarithms except inflation and GDP due to negative values. Cointegration tests H_0: non-cointegration, critical values for Phillips-Peron and ADF test based on program (*urcdist*) in MacKinnon (1996), with variables=12, constant and trend, sample = 129 and critical value at 1%. Robust standard errors are used in all columns.

Appendix

General version of the multiprincipal, multitask model of interest group politics.

In this appendix we formally elaborate the verbal description in section II. The model is based on Dixit (1996) but has two important extensions. The first is that the model is adapted to the context of interest game pressure with principals providing incentives in the form of both votes and contributions. The second and more important extension is the endogenization of the size of the information asymmetry Ω, as principals are allowed to affect the level of information received by other principals.

Suppose $n+1$ principals, composed of n interest groups plus voters and the government as the agent. Each of the $n+1$ principals is interested in a specific task that they would like the agent to perform. In general the principals do not observe the level of effort, t, placed by the government in each task, instead they observe the outcome, x, of that effort. The vector of outcomes is modeled as $\boldsymbol{x} = \boldsymbol{t} + \boldsymbol{\varepsilon}$, or:

$$\begin{vmatrix} x_1 \\ x_2 \\ \vdots \\ x_{n+1} \end{vmatrix} = \begin{vmatrix} t_1 \\ t_2 \\ \vdots \\ t_{n+1} \end{vmatrix} + \begin{vmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_{n+1} \end{vmatrix} \qquad \text{(A1)}$$

where $\varepsilon \sim N(0,\Omega)$ and Ω is the covariance matrix of the random noise variable ε. Ω is a $(n+1)x(n+1)$ matrix with principal diagonal ω_{ii}, $i=1, 2, \ldots n+1$, and zeros elsewhere.

Principal i benefits from the government's actions according to the benefit functions b_i, which can be written as $\mathbf{b}^{i\prime}\mathbf{x}$, where b_j^i is the benefit of outcome j, $j=1, 2, \ldots n+1$, to principal i. The cost to politicians of directing effort in both of the tasks is modeled as the following quadratic function $\frac{1}{2}t'Ct$ where the $(n+1)x(n+1)$ matrix $\boldsymbol{C}$ is assumed positive definite. If the off-diagonal terms are positive there will be substitution amongst types of effort, so that an increase in t_i will imply a decrease in t_j, and vice-versa. If these terms are negative the types of effort will be complementary

Following Dixit (1996) we first assume a benchmark case where the principals observe the levels of effort chosen by politicians and additionally are able to act cooperatively so as to reach the first-best solution.

Observable effort and united principals

We assume that the agent's efforts in pursuing the $n+1$ tasks are rewarded with political support from each of the principals. The support is in the form of monetary contributions and votes. Let the support provided by each principal be p_i. The total level of political support received is the sum of the support contributed by each $n+l$ principals, $p = \sum_{i=1}^{n+1} p_i$. Offering political support imposes on the principals an opportunity cost so we can treat p in monetary terms. That is, p can be thought of as the amount of resources that the politicians would require for advertising and campaigning to achieve an equivalent amount of support. The pay-off to politicians is thus $w = p - \frac{1}{2}\,\boldsymbol{t'Ct}$. The politicians' utility function is assumed to have the following constant risk-aversion form:

$U(w) = -exp(-rw)$ or $-exp\text{-}r(p - \frac{1}{2}\,\boldsymbol{t'Ct})$ (A2)

where r is the risk-aversion coefficient. Note that politicians will maximize $w = p - \frac{1}{2}\,\boldsymbol{t'Ct}$, the income equivalent of their utility.

The expected return to the principals acting together is their benefit minus the value or cost of providing political support to politicians.

$$E[b'x - p] = E[b'(t+\varepsilon) - p] = b't - p \qquad \text{(A3)}$$

The total surplus is therefore the sum of the agent's and the principals' net benefit $b't - p + p - 1/2t'Ct = b't - 1/2t'Ct$. Note that the level of political support cancels out, so we assume that p is high enough for the agent to stay in the game, that is, the government will not abandon these policies. The level of effort will be chosen to maximize this function, giving as the first-order condition $\boldsymbol{b} - \boldsymbol{Ct} = 0$, so that the first best level of effort is:

$$\boldsymbol{t} = \boldsymbol{C^{-1}b} \qquad \text{(A4)}$$

where $\boldsymbol{C^{-1}}$ is the inverse of the $\boldsymbol{C}$ matrix.

Asymmetric information and united principals

Because effort is now no longer observable to general voters, contracts between the principals and politicians must be made contingent on $\boldsymbol{x}$ (outcomes) and no longer on $\boldsymbol{t}$ (effort). Following Dixit (1996) and Holmström and Milgrom (1991) we use a linear reward scheme to stipulate the legislators' pay-offs given outcomes $\boldsymbol{x}$. That is, given the observed outcomes $\boldsymbol{x}$, the united principals provide politicians political support that has the following monetary equivalent:

$$\alpha' x + \beta \text{ or } \left|\alpha_1 \quad \alpha_2 \quad \cdots \quad \alpha_{n+1}\right| \left| \begin{matrix} x_1 \\ x_2 \\ \vdots \\ x_{n+1} \end{matrix} \right| + \beta \qquad \text{(A5)}$$

where the αs are the value of the marginal support given by the principals to government effort and β is a fixed payment that can be adjusted to assure the agent's reservation utility is at least matched.

Thus the politicians' utility is now $-exp(-r(\boldsymbol{\alpha'x} + \beta - \tfrac{1}{2}\boldsymbol{t'Ct}))$, which can be shown to equal[37] $-exp(-r\boldsymbol{\alpha't} + \tfrac{1}{2} r^2\boldsymbol{\alpha'\Omega\alpha} - r\beta + \tfrac{1}{2} r\boldsymbol{t'Ct}))$ so that the government will now maximize the income equivalent of their utility, which is $z = \boldsymbol{\alpha't} - \tfrac{1}{2} r\boldsymbol{\alpha'\Omega\alpha} + \beta - \tfrac{1}{2}\boldsymbol{t'Ct}$. This yields the following first-order conditions:

$$t = \boldsymbol{C^{-1}\alpha} \qquad \text{(A6)}$$

Note that the αs are the value of the marginal support given by the principals to reward the government's effort. Letting k be the elements of $\boldsymbol{C^{-1}}$, $k_{jj} > 0$ and $k_{jh} \geq$ or ≤ 0, for $j \neq h$, so an increase in the marginal support of the united principals to politicians, α_j, leads to increased effort in task j and an increase or a decrease in effort towards the other tasks.

In order to understand the relationship of $\boldsymbol{\alpha}$ in (A6) and $\boldsymbol{b}$ in (A4) substitute (A6) into the government's income equivalent of utility, z, to get $z = \tfrac{1}{2}\boldsymbol{\alpha'C^{-1}\alpha} - \tfrac{1}{2} r\boldsymbol{\alpha'\Omega\alpha} + \beta$. The net benefit of the principals is the expected value of their total benefit minus the value, or cost, of the support they give the government, $E[\boldsymbol{b'x} - \boldsymbol{\alpha'x} - \beta] = (\boldsymbol{b} - \boldsymbol{\alpha})\boldsymbol{'t} - \beta$. The joint surplus of the united principals and politicians is the sum of their net benefits:

$$\boldsymbol{b'C^{-1}\alpha} - \tfrac{1}{2}\boldsymbol{\alpha'}(r\boldsymbol{\Omega} + \boldsymbol{C^{-1}})\boldsymbol{\alpha} \qquad \text{(A7)}$$

This can be maximized with respect to $\boldsymbol{\alpha}$ to obtain the following first-order condition:

$$\boldsymbol{b} = (\boldsymbol{I} + r\boldsymbol{C\Omega})\boldsymbol{\alpha} \qquad \text{(A8)}$$

Note that if; (i) all elements of $\boldsymbol{C}$ are positive (assuming substitutability amongst tasks); (ii) the elements of $\boldsymbol{\Omega}$ are positive, because they are variances; (iii) the $\boldsymbol{\alpha}$s are positive, because the united principals will not want negative effort, it must be that $b_j > \alpha_j$. Consequently, comparing (A4) to (A6) it turns out that the government optimally chooses less effort when effort is not observable than in the first-best situation where it is, that is, it is a second-best due to moral hazard arising from information asymmetries.

Asymmetric information and multiple principals

In general principals do not act cooperatively, so we now derive the optimal levels of effort allowing for non-cooperative behavior in addition to asymmetric information. In order to do this we will find the Nash equilibrium of the game where each principal strategically takes into account the actions of the other principals. Now each principal provides his own agenda to politicians. Principal i's incentive scheme for task j is $\alpha^i_j x + \beta^i$ while the total for each principal is $\boldsymbol{\alpha^i{}'x} + \boldsymbol{\beta^i}$. The aggregate incentive scheme faced by legislators is the sum of that offered by each principal and is simply $\boldsymbol{\alpha'x} + \boldsymbol{\beta}$, where $\boldsymbol{\alpha} = \Sigma\,\boldsymbol{\alpha^i}$ and $\boldsymbol{\beta} = \Sigma\,\boldsymbol{\beta^i}$. The marginal benefit function for principal i is $\boldsymbol{b^{i'}} = \left|b^i_1 \quad b^i_2 \ldots \quad b^i_{n+1}\right|$.

The government still maximizes its certainty equivalent and choose effort according to $\boldsymbol{t} = \boldsymbol{C^{-1}\alpha}$. In order to find the Nash equilibrium of this game we follow Dixit (1996:163-166) and consider the contribution of each of the principals to the legislators' certainty equivalent. This is then added to the benefit that each principal receives from the relationship with politicians. The resulting bilateral surplus between principal i and politicians is:

[37] See Dixit (1996, pg. 161).

$$b^i C^{-1}\alpha^i - r\alpha^{-i\prime}\Omega\alpha^i - \frac{1}{2}\alpha^{i\prime}(C^{-1}+r\Omega)\alpha^i \qquad \text{(A9)}$$

where $\alpha^{-i} = \sum_{h\neq i}\alpha^h$, the sum of the incentives by all other principals apart from *i*.

If we assume that the only choice variable available to principal *i* is the support it gives directly to legislators through votes and/or money, then the maximization of this objective function with respect to α^i gives:

$$\boldsymbol{b^i = (I + rC\Omega)\alpha^i + r\,C\Omega\alpha^{-i}} \qquad \text{(A10)}$$

Adding the individual benefit of each principal gives us an expression for the total benefit arising from the Nash equilibrium:

$$\boldsymbol{b = \alpha + (n+1)r\Omega C\alpha} \qquad \text{(A11)}$$

This equation can be compared to equation (A8), the total benefit that resulted when principals were able to act cooperatively: $\boldsymbol{b = (I + rC\Omega)\alpha}$. Remembering that when $\boldsymbol{\alpha = b}$ and the first-best solution is achieved, we can see that with non-cooperative principals a situation is reached that is even further from first-best than with unified principals, since *r* is now multiplied by *n+1*. The situation is therefore a third-best, characterized by apparent inefficiencies and low-powered incentives.

For greater ease in visualization, the system of equations in (A11) can be written as follows:

$$b_i^j = \alpha_i^j + r\sum_{k=1}(c_{i,k}\omega_{kk}(\sum_{h=1}\alpha_k^h)) \qquad \forall\, \mathrm{i, j, k, h} = 1,2,...,\mathrm{n}+1 \qquad \text{(A12)}$$

Note that each of the $(n+1)^2$ equations in this system contains the terms ω_{kk} *(k=1,2,…,n+1)*, which represent the variance of the noise between the observable outcomes x^k and the unobservable effort t^k. Therefore, the higher the value of any given ω_{kk}, the larger will be the wedge between the first-best situation, $b_i^j = \alpha_i^j$, and the third-best situation depicted in (A12). In other words, the greater the information asymmetry concerning legislators' efforts in any given task, the more low powered will be the incentives given by the principals for efforts towards that task.

Affecting information availability to pursue policy

The above suggests that each of the *n+1* principals can influence policy not only through direct incentives (cash, votes) represented by $\boldsymbol{\alpha^j}$, but also by affecting the level of information available concerning politicians' efforts in each task, that is, on each of the *n+1* ω_{kk}'s. The problem faced by each interest group then becomes that of deciding not only the optimal level of α_j^i to allocate for each task *j*, but also on how much effort it will place towards affecting the information available to general voters regarding each of the tasks. Let the effort by each interest group *i* to influence the information concerning legislators' efforts in each task *j* be $e^{i\prime} = \left|e_1^i \quad e_2^i \quad \ldots \quad e_{n+1}^i\right|$. Note that effort is costly, where the cost of that effort is represented by the cost function $G^i(e^i)$. Note also that all other interest groups may also expend efforts to affect information availability, so that the solution will be a Nash Equilibrium. Let e^{-i} be the vector of effort of all interest groups other than *i*. Interest group *i*'s objective is no longer to maximize (A9) with respect to α^i but rather to maximize the following objective function with respect to α^i and e^i taking α^{-i} and e^{-i} as given:

$$b^{i\prime}C^{-1}\alpha^i - r\alpha^{-i\prime}\Omega(e^i,e^{-i})\alpha^i - \frac{1}{2}\alpha^{i\prime}(C^{-1}+r\Omega(e^i,e^{-i}))\alpha^i - G^i(e^i) \qquad \text{(A13)}$$

Note that the difference of (A13) to (A9) is the cost function and the fact that the matrix of information variances is now a function of the level of effort by each principal to influence information. The first order conditions for the maximization of (A13) are:

$$C^{-1}b^i - r\Omega\alpha^{-i} - (C^{-1}+r\Omega)\alpha^i = 0 \qquad \text{(A14)}$$

$$-r\Omega^i a^i - \frac{1}{2}r\Omega^i\alpha^{2i} - G_e^i = 0 \qquad \text{(A15)}$$

where $a^{i\prime} = \left|\alpha_1^{-i}\alpha_1^i \quad \alpha_2^{-i}\alpha_2^i \quad \ldots \quad \alpha_{n+1}^{-i}\alpha_{n+1}^i\right|$, $\alpha^{2i\prime} = \left|(\alpha_1^i)^2 \quad (\alpha_2^i)^2 \quad \ldots \quad (\alpha_{n+1}^i)^2\right|$,

$$G_e^i = \left| \frac{\partial G^i(e_1^i)}{\partial e_1^i} \quad \frac{\partial G^i(e_2^i)}{\partial e_2^i} \quad \ldots \quad \frac{\partial G^i(e_{n+1}^i)}{\partial e_{n+1}^i} \right| \text{ and } \Omega^i = \begin{vmatrix} \frac{\partial \omega_{11}(e_1^i, e_1^{-i})}{\partial e_1^i} & 0 & \ldots & 0 \\ 0 & \frac{\partial \omega_{22}(e_2, e_2^{-i})}{\partial e_2^i} & \ldots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \ldots & \frac{\partial \omega_{n+1,n+1}(e_{n+1}, e_{n+1}^{-i})}{\partial e_{n+1}^i} \end{vmatrix}$$

The first order conditions in (A14) are a system of *n+1* equations that define $\boldsymbol{\alpha^{i*}}$, the *n+1* optimal incentives by principal *i* for each task. The interpretation of these equations is as before in (A10); the principal will offer a third-best level of incentive for each task due to the information asymmetries and the existence of *n* other principals who are also providing incentives to the government.

The first order conditions in (A15) are also a system of *n+1* equations. They define $\boldsymbol{e^{i*}}$, the optimal level of effort that principal *i* will place towards affecting information availability on each of the *n+1* tasks. The two terms on the left of each equation in that system shows how much the marginal effort increases or reduces the wedge between the first-best situation $\boldsymbol{b^i = \alpha^i}$ and the third-best situation $\boldsymbol{b^i = \alpha^i} + r\,\boldsymbol{C\Omega\alpha}$ (derived from (A14)).