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Abstract

Imperfections like bureaucratic corruption and extra-legal influence of various stakeholders – including political parties and civil society organisations – can reinforce one another and distort property rights. We characterise conditions under which holdout in land acquisition arises precisely because of the interplay between these imperfections. Among other results, we develop testable hypotheses suggesting that reducing bureaucratic corruption may in fact increase holdout if these imperfections are significant. In addition, small improvements in institutions can hurt economic surplus. Moreover, sellers are worse off when institutions fail to control excessive opposition, although the fact that there is an opposition to land acquisition benefits the sellers.

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Keywords: Land acquisition; bureaucratic corruption; political rent-seeking; opposition; holdout.

1 Introduction

The lack of availability of land is one of the biggest obstacles to industrialisation in many countries. Protests and counter protests, agitations and counter agitations over the issue of land acquisition are an everyday feature in many LDCs that are seeking to industrialise, and this trend is observed in some parts of the developed world as well.[1] The most common explanation is that it is difficult

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[1]Even in authoritarian China, and in 2005 alone, there were over 60,000 local disturbances provoked by attempts at acquiring agricultural land (Banerjee et al., 2007). Cao et al. (2008) report that, in the first 9 months of 2006, there were 17,900 cases of "massive rural incidents" in China, involving around 385,000 protesting farmers. Further, between 1996-2005, 20 million farmers were evicted from agriculture due to land acquisition, with more than 21 per cent of arable land being converted to non-agricultural use between 1996-2005 (Goswami, 2007). In Brazil, protests against the acquisition of farmland between 2009-2011 delayed one of its most promising industrial projects, CISPA worth USD 40 billion (Pedlowski, 2012). According to Quartz India reports, around USD 9 billion worth of mega projects in India are being stalled merely due to land acquisition problems. See http://qz.com/398151/modis-math-is-wrong-only-8-of-projects-are-actually-held-up-because-of-land-acquisition/. In Kenya, local community protests led to the eventual scrapping of a project by Nuove Iniziative Indutrialis Sri (NIIsri) (Maggi, 2013).

to agree on a price for land that is fair to all the stakeholders given that land is a special asset with a fixed supply and very high attachment value, and that agricultural land owners have very few alternative means of livelihood. Many countries, including the US and India, have therefore promulgated 'eminent domain' laws that allow land acquisition for public purposes on payment of fair compensation. Yet the problem persists, thereby fuelling research geared towards understanding what determines a fair compensation and redistribution package. The purpose of the present paper is however to look beyond the issue of compensation, and provide a 'political economy based' micro-foundation of the land acquisition process, one that can help understand the causes and consequences of the various problems that seem to enwreathe it.

Outside interference - form and motivating examples: Agitations over land acquisition, both for and against, have seen the involvement of several kinds of 'agents' including of course buyers and sellers. Given that land acquisition in most countries, in particular in LDCs, involves some mediation by the local government, one often finds that the party in power supports land acquisition.[2] Such support by the ruling party may either be direct, or possibly indirect, involving the (mis)use of government machinery. In contrast, opposition may come from a much wider spectrum of stakeholders, including various interest groups like the civil society organisations and political parties typically out of office. In many cases such agitations are wholly carried out by interest groups[3] and in other cases, while the issue may be initially taken up by one or more interest groups, political parties step in later, and either take over from these interest groups, or conduct the agitation in partnership with them.[4]

We consider a number of motivating cases from India that exemplify the broad dynamic patterns discussed above. We begin by discussing the so called Nandigram agitations in West Bengal, India, in 2007 when land acquisition by the West Bengal government for building a chemical hub witnessed violent agitations. This attempt at land acquisition was backed by the ruling Left Front, a coalition of leftist parties, allegedly helped by the local bureaucracy and

[2]In the Indian context, following its independence in 1947, land acquisition was key to several large public projects, building of dams, expansion of roadways and railways, building of factories run by public sector firms, etc. At this point of time there was a broad political consensus that land acquisition, while costly for those displaced, had to be done for the sake of the nation. The fact that the affected almost always belonged to the marginal sections of the society, e.g. tribals, etc. also helped.

[3]Often the initial agitations may be carried out by interest groups who are ideologically motivated. In the Indian context, the growth of civil society has been astronomical, from around a few hundred thousand NGOs around the 1970s, to around around 3.3 million by mid-2010. Jenkins (2012) argues that two separate strands of the civil society movement, those opposing large scale displacement, as well as those opposing 'neoliberal globalization' started coming together around mid-2010. Given that land acquisition is an emotive issue (especially in an LDC context since, in the absence of proper rehabilitation, it can lead to serious humanitarian tragedies), such ideological stances are easy to understand. Fernandez (2007), for example, argues that over the period 1947-2000, as many as 60 million persons were displaced for various development projects, many of whom were not properly rehabilitated.

[4]It appears that political parties start to get involved when certain key conditions are met (for a discussion of the Indian scenario see Chakravorty, 2013). First, the media should become more active, which would ensure greater political mileage in case of involvement. Second, interest groups, who not only provide necessary information and support to the involved landowners, but also coordinate the initial resistance, are active in the area. This creates potential 'flashpoints' which political parties can exploit. Further, intervention becomes more attractive if there is land fragmentation, which increases the number of affected people, along with economic development, which creates a need for land acquisition.

police.[5] The agitation was initially spearheaded by two interest groups, the Gana Unnayan O Jana Adhikar Sangram Committee (Committee for Public Development and People's Rights Struggle) and the Nandigram Jomi Uchhed Birodhi O Jana Shakti Raksha Committee (Nandigram Committee to Resist Land Ousting and Save People Power). Later, several political parties, including the Congress and the Trinamul Congress joined the protests. The resulting agitations led to massive violence requiring police involvement, and even led to farmer deaths (Banerjee et al., 2007).

In 2006, the state government of West Bengal used the archaic Land Acquisitions Act of 1894 to help a private firm acquire 997 acres of prime agricultural land for building an automobile factory in Singur. The process was not only championed by the ruling Left Front, it appears that, like in Nandigram, the ruling coalition used the bureaucracy and the police to further its cause in this case as well.[6] The opposition to land acquisition was organized around the Krishi Jomi Bachao Committee (Committee to Save Farmland) formed in 2006. Interestingly this was a rainbow coalition, consisting of various interest groups, e.g. the Uchchhed Birodhi Committee (Committee Against Forced Displacement), the Gana Unnayan O Jana Adhikar Sangram Committee, among others, but also various political parties including one of the main local opposition parties, the Trinamul Congress (TMC), as well as parties belonging to the extreme left, e.g. the CPI (ML) State Organising Committee. The resulting agitation led to fasts, highway blockades, strikes, and even alleged rapes and suicides. Ultimately the project had to be scrapped (see, e.g. Sarkar, 2007, and Ghatak and Banerjee, 2009).

Another relevant example is the Vedanta project, seeking to develop an alumunium factory in the Kalahandi districts of Orissa in 2002. While the land acquisition process was supported by the ruling Biju Janata Dal (BJD) government, and their ally the Bharatiya Janata Party (BJP), it was opposed by a local organization, the Save Niyamgiri Group, later joined by others like Green Kalahandi, as well as some international organizations, including Amnesty International. Interestingly, while the Congress leader Rahul Gandhi was personally opposing this, much of the opposition was actually carried out by the government machinery of the Central Government (including the Ministry of Environment and Forests), then ruled by the Congress party.[7,8]

Rationale for outside interference: Why does land acquisition often lead to *outside interference* leading

[5] In the context of the Nandigram agitation, one of the opposition leaders, Partha Chatterjee of the Trinamul Congress, stated that "the bureaucrats and top police officers are under tremendous pressure", arguing that this "incident has exposed their ploy to use the government machinery for partisan purposes." See http://archive.indianexpress.com/news/trinamool-s-plea-to-bureaucrats-and-police/717234/.

[6] Among other examples, one can mention that during this agitation the state government got the government machinery to impose Section 144 of the Criminal Procedure Code in parts of Singur, with Section 144 conferring several powers on the government aimed at restricting personal liberty. See http://timesofindia.indiatimes.com/india/Sec-144-in-Singur-illegal-HC/articleshow/1614554.cms?referral=PM.

[7] We refer the readers to Chakravorty (2013) for a discussion of all these cases, as well as a broad survey of the land acquisition process in India.

[8] Political interference was also evident in several other land acquisition processes in India, such as by the Orissa government for building a steel plant by Posco (Chandra, 2008), by the Jharkhand government for building a steel plant and also a power project in Khuntia district (Basu, 2008), by the Himachal Pradesh government for building an international airport along with air cargo hub at Gagret in the Una district (Panwar, 2008), among others. In Bangladesh, differences between local and state politicians often result in land disputes and violence, that lead to political interference (Pons-Vignon and LeComte, 2004).

to agitations and even political interventions, in particular in LDCs? The literature traces this connection to the imperfection of the institutional framework in LDCs, in particular to legal and political infirmities. Among legal weaknesses, it has been argued that weak property rights form a critical bottleneck, which in turn can be traced to out-dated land records, poor land surveys and improper identification of *de facto*, as well as *de jure* owners (Lindsay, 2012, and Feder and Feeny, 1991).[9] These aspects of the land market, along with legal requirements that land sale must involve state-level bureaucracy (see Chakravorty, 2013, for the case of India), exacerbates bureaucratic corruption and results in higher transaction costs.

Weak property rights, coupled with weak law enforcement create a space for political interference in the process of land acquisition. The ruling party can help reduce the high transaction costs resulting from bureaucratic corruption, thereby making their presence an attractive option for the buyers, as well as for the sellers who wish to sell their land. The incentive for such political intervention is greater in the presence of *political* parties who have a direct stake in the process and take sides depending, among other issues, on whether they are in power or in opposition. The party in power seems to typically support land acquisition, so as to satisfy the growing economic aspirations of the masses, that can only be met through industrialisation. Whereas the parties in opposition seem to typically oppose it, as they may see a scope for electoral gains from political obstructionism.[10] Moreover, opposition may also be ideologically driven and spearheaded by interest groups, as mentioned above. *Outside interference* in this paper will therefore involve be two entities: (a) one that opposes and obstructs efficient economic outcomes from being implemented peacefully, and (b) another that helps economic agents fight against this opposition but engages in political rent-seeking in exchange.[11]

The present paper builds a theory of land acquisition where emergence of outside interference and the presence of bureaucratic corruption feed into each other, and studies its consequences on holdout, price of land and welfare.

Theoretical framework: We consider an economy with weak institutions (that promote bureaucratic corruption and outside interference) comprising a buyer who needs plots of land from several sellers, with the profitability of the project being dependent on the number of plots the buyer manages to acquire. There are two 'parties', one standing 'for' land acquisition, called F, and the

[9]Such weak property rights is an important reason why land markets are thin in most LDCs, see Binswanger et al., 1995. As argued by Alston et al. (2012), the absence of *de jure* property rights – as was the case in frontier regions of several countries, including Australia, Brazil and the U.S. – led to problems in land acquisition. Further, in case of private bargaining, ill-defined property rights force buyers to deal with non-owners, possibly leading to conflict (Banerjee et al., 2007). Relatedly, in Brazil, there were conflicts between landowners and squatters over property rights (Alston et al., 2000).

[10]In the Indian context, for example, while the CPM (the principal Marxist party in India) supported land acquisition in West Bengal and Kerala when they were in power in these states, they opposed land acquisition everywhere else. Similar examples involving the two national parties of India, the Congress and the Bharatiya Janata Party, are also easy to find.

[11]Such outside interference - particularly by the entity opposing land acquisition - may also be triggered by behavioural reasons that ensure that the land valuations by the buyers exceed what may be expected from purely economic considerations. One reason could be present-biased preferences, an issue examined in Roy Chowdhury (2013). Another reason could be that the buyers value land for cultural and religious reasons, something that seems to have been of importance in the Vedanta case discussed earlier. In this paper we however abstract from such issues.

other 'against', called A. Following the preceding discussion, we shall interpret F as essentially the party in power, or elements in the government that are willing to follow the agenda of the ruling party. On the other hand, A can be interpreted as either an interest group, and/or a political party that opposes land acquisition, at least locally. Given the presence of bureaucratic corruption, party F has an incentive to step in, promising 'help' in resolving any problems arising out of such institutional weaknesses. To be precise, it can lower the transactions costs associated with land sale for both the buyer as well as the sellers by tackling bureaucratic corruption. Moreover, weak law enforcement allows A to possibly slow down the process through various means, legal or extra-legal, including violence. This enlarges the scope of party F since it can help overcome this opposition.

Thus the buyer rationally decides to involve party F in the process of land acquisition, and through F makes a take-it-or-leave it offer to the sellers. Of course, the sellers are free to bypass party mediation and approach the buyer directly.[12] We embed this interaction within a larger game where A decides on its level of opposition that affects party F's operation costs to fight against it. Party F decides on the rent it charges from the buyer in return for its participation in the process. Thus the extent of outside interference is endogenous in our framework, and is determined by deeper institutional parameters like level of bureaucratic corruption and ease of organising opposition.

Endogenising this outside interference is important for several reasons. First, several key comparative statics results with respect to the effects of institutional changes are sensitive to whether the interference levels are endogenous, or not (as we show in the Online Appendix). Thus a framework where the interference contest is exogenous may yield misleading conclusions. Second, it allows us to examine if holdout persists even if the degree of interference is endogenous and parties react to forthcoming economic activities that are shaped by the interference positions they themselves take. This enables one to also determine equilibrium interference and rent-seeking as a function of size of corruption and ease of opposing acquisition.

Results: We solve for the equilibrium of this game. We say that the equilibrium involves holdout if there is a positive probability that A manages to halt the project owing to unwillingness on part of some sellers to accept early offers from the buyer. The central question is if the equilibrium involves holdout, which is inefficient. We then examine how the magnitude of holdout and price of land are related to the deeper institutional parameters of this economy, namely, the level of bureaucratic corruption and the ease of opposition.

Our first major result is a characterisation of conditions such that outside interference leads to holdout. It is interesting that holdout obtains even though our framework does not allow for either complementarity in the number of plots, or any last mover advantage, the two key elements that generate holdout in the strategic bargaining framework (see Section 1.1 for more on this). First consider the late stage of the game where the level of opposition by A, as well as the rent being charged by party F is fixed. We find that the equilibrium involves holdout whenever the per seller rent charged by party F is significantly higher than the transactions costs due to bureaucratic

[12]Given our focus on building an institution-based theory of land acquisition, the model bypasses the otherwise well studied issue of unfair compensation whereby the sellers may be forced to sell at prices that are lower than their own valuation for the land. Our framework however allows for a limited role for such considerations in that the valuations can be interpreted as one that is set by some minimum price regulation aimed at protecting the sellers.

corruption, which is intuitive since acquiring too many plots through F may be very costly for the buyer if the political rent is large. Why does not party F charge a lower rent though, given that doing so leads to a greater number of sellers joining party F, thereby increasing party F's political clout? We find that the equilibrium involves holdout as long as opposing is relatively inexpensive for A, and/or A is sufficiently motivated. In that case A provides significant opposition to land acquisition, which in turn ensures that the pro-acquisition party, i.e. F, is forced to charge a high political rent. This in turn ensures that there is holdout.

Our second major result relates to the effects of changes in the degree of bureaucratic corruption on several measures of welfare, including economic efficiency. We demonstrate that a reduction in corruption affects both the magnitude of holdout, as well as the economic surplus in a non-monotonic fashion, with the results depending on whether we are dealing with a relatively developed nation (i.e. one with low levels of corruption), or an LDC (where corruption is relatively high), to begin with. We find that while a fall in corruption *reduces* holdout when corruption is low, it necessarily *increases* holdout when corruption is high. This generates a testable hypothesis that one can potentially take to data. Eyeballing for some evidence from India suggests that this hypothesis is not inconsistent with the Indian experience. Why does the effect depend upon whether corruption is large or small to begin with? Intuitively, a reduction in transactions costs has two effects, one direct, in that it increases a seller's incentive to sell her plot, and one indirect, in that it makes it less attractive for the buyer and the sellers to work through party F since F responds to a decrease in corruption by increasing the political rent it charges. This in turn reduces party F's political clout in that a smaller number of sellers sell via political intermediation, making holdout more likely. If corruption is large to begin with, so that party F is more motivated (relative to the net returns from the project), then the political considerations that drive the indirect effect becomes quite important, hence the indirect effect dominates. corruption

The effects of a change in bureaucratic corruption on the economic surplus is also interestingly nuanced, with a decrease in corruption reducing the economic surplus in an LDC where the existing levels of corruption is already high, whereas it increases the economic surplus in a more developed economy. The result of course follows from the fact that a reduction in corruption in land sales can either increase or decrease holdout depending on whether it is easy to oppose due to institutional weakness, or not.

We also find that an increase in bureaucratic corruption necessarily reduces the price of land that is sold through party F. Depending upon the relative bargaining powers of the two sides, such a change may however either increase or decrease the price that is settled directly between the buyer and the sellers. Nevertheless, the dispersion in price across these two phases of land acquisition necessarily increases. These results remain qualitatively intact even if party F can impose credible threats and coerce sellers, except that now there may be instances where a rise in corruption increases the price of land sold through party F. Moreover, while the possibility of coercion increases both opposition and rent-seeking as expected, its impact on the size of holdout is interestingly nuanced, and can go either way.

Finally turning to the sellers' welfare, we find that an increase in corruption unambiguously hurts sellers. However, there is a non-monotonic seller preference for opposition from A given that party F exists. They all want opposition, irrespective of whether this opposition enables them to retain their bargaining power with the buyer or not, but only up to existence; once opposition

exists they want to minimise its presence.

1.1 Related Research

Formal treatments of the holdout problem (using game theoretic arguments) were first provided in Eckart (1985) and Asami (1988). The theoretical literature was further developed in Cai (2000, 2003), Menezes and Pitchford (2004), Miceli and Segerson (2007) and Roy Chowdhury and Sengupta (2012).[13] These models typically examine a strategic bargaining framework, with complementarity in the number of plots acquired. These two aspects generate a possible last mover advantage, which can generate inefficiency in the form of delay, as demonstrated by Cai (2003), Menezes and Pitchford (2004) and Miceli and Segerson (2007). Roy Chowdhury and Sengupta (2012) however demonstrate that there exist equilibria that are asymptotically efficient whenever the bargaining protocol is transparent, so that inefficiency does not necessarily follow.

In line with this literature, our paper also shows that inefficiency can obtain even under complete information. However, in contrast, we provide a theory of holdout which does not rely on technological complementarity among plots for holdout to emerge, but rather on institutional weaknesses that allow various parties to intervene in the process. Interestingly, note that we employ a bargaining protocol which is transparent in the sense of Roy Chowdhury and Sengupta (2012), in that all offers are publicly observable. Nonetheless, in contrast to Roy Chowdhury and Sengupta (2012), we find that inefficiency continues to exist. Finally note that this literature, as well as the present paper, contrast with the literature on bilateral trade problems considered in Chatterjee and Samuelson (1983) and Myerson and Satterthwaite (1983) (amongst others), where inefficiency is obtained under incomplete information.

This paper also stands in contrast to several branches of the literature. Thus unlike Collins and Isaac (2012), we do not allow for contingent contracts. Moreover, in contrast to Ghatak and Ghosh (2011), Singh (2012) and Kominers and Weyl (2011), we obtain holdout even without invoking contiguity concerns. Finally, we obtain holdout in a framework with rational players, unlike Roy Chowdhury (2013), where preference irrationality, namely present biased preferences, is required.

Although the correlation between bureaucratic corruption, politics and economic development is well accepted, the literature on this issue is divided. While one strand of the literature interprets corruption as an obstacle to economic development (see for example Blackburn et al. (2006), Mauro (1995) and Murphy et al. (1993)), the other argues that corruption may 'grease' the process of development, thereby facilitating beneficial trades and improving efficiency (see for example Levy (2007), Egger and Winner (2005), Beck and Maher (1986) and Leff (1964)). Turning to the empirical literature, there is anecdotal support for the latter viewpoint, at least in the context of less developed economies (see Aidt (2009)). Moreover, while the literature on how inefficiencies in democratic institutions affect the level of corruption is limited, there is some evidence that the political environment affects the likelihood of successful development (see for example, Svensson (2005), Paldam (2002), Ades and Tella (1997) and Bardhan (1997)). The theory presented in this paper unifies these various strands in the context of land acquisition by providing conditions under which both these positions prevail. For example, we show that while a reduction in corruption

[13] In the patents literature, Shapiro (2001) suggests that strategic holdout is a serious obstacle to R&D, and consequently long-run growth.

reduces the holdout problem when corruption is not too large to begin with, it may increase holdout otherwise.

The remainder of the paper is organised as follows. Section 2 presents the model, while Section 3 studies how economic decisions are shaped by the degree of outside interference emerging in the early stages of the framework, and how that induces holdout. This leads to Section 4 that studies how the two parties, foreseeing the actions of the buyer and the sellers, attempt to influence the outside interference climate. Section 5 contains how changes in the deeper parameters of our framework affects several variables of interest, including the level of holdout and the economic surplus, whereas in Section 5.1.1 we also look at some preliminary evidence from India concerning the effects of corruption and ease of opposition on the incidence of holdout over the past decade. The paper concludes in Section 6. All proofs are included either in an Appendix in Section 7, or an Online Appendix in Section 8.

2 Theoretical framework

Local economy and the industrial project: A representative locality whose economy is based on land (agriculture, farming or forestry) consists of a continuum of sellers (of unit mass) holding identical plots of land all of which yield a non-negative return v to their owners in their current uses.[14] A buyer B wishes to buy land in order to set up a project that yields a revenue of $V(x) = \lambda x$, where $0 \leq x \leq 1$ is the fraction of plots used, and λ is the marginal productivity of land when used in the project.

Bureaucratic corruption: The process of land acquisition faces several institutional weaknesses. One such weakness stems from *bureaucratic corruption* associated with land transactions in general, and in offices dealing with land transactions in particular. As a result, any land sale between an individual seller and a buyer involves a transactions cost of $r_I \geq 0$, with the buyer bearing a fraction β, and the seller a fraction $1 - \beta$ of this cost, where β is exogenous to our analysis. Thus in our model r_I is an index of bureaucratic corruption, with a higher r_I denoting higher bureaucratic corruption. We will assume throughout that $\lambda - v \geq r_I$, so that the project is economically viable even after accounting for this bureaucratic corruption.[15]

Outside interference: The buyer and sellers confront an interference process that involves two 'parties' with opposing incentives, one that is *for* land acquisition (called F), and the other that is *against* such land acquisition (called A), with F and A being the obvious mnemonics for 'for' and 'against'. F typically represents not only the ruling political party, but also elements of the administrative machinery that can either gain directly from 'helping' the locality with industrialisation, or are simply required to follow F's orders.[16] Whereas A comprises political parties in opposition or

[14] One can also interpret v as arising out of some minimum price legislations, where this minimum price exceeds the sellers' valuation for their land. Such enactments are now prevalent in many LDCs as well as developed nations in order to avoid problems arising from seller dissatisfactions. Thus this framework assumes that any problem concerning unfair compensation has been already resolved.

[15] If $\lambda - v < r_I$, then one would simply look at mechanisms to reduce this corruption, something that is not the purpose of the present research.

[16] In the Indian context, Gould (2011) writes about the "longterm customs of interactions between agencies of the state - government servants and police, and their engagement with local politicians".

interest groups (or a combination of the two), whose main objective is to obstruct the process of land acquisition. The outside interference process interacts with the process of land acquisition at several levels. First, if the project is to be undertaken in the area, land sale must involve the pro-industrial party F, as otherwise it becomes impossible for the buyer to overcome the opposition from A. Further, the bureaucratic corruption cost r_I described earlier can be bypassed only if the sale is mediated by party F.

Early offers: Given that the involvement of party F is necessary for the project to go through, the buyer initially works through party F. He specifies a plot price $q \geq 0$ and a fraction $0 \leq k \leq 1$ of the plots that he wishes to buy through party F, which then approaches a fraction k of the sellers with this price offer.[17]

Interference contest: It is natural to assume that the larger the fraction of sellers who announce their willingness to sell early on in the acquisition process, the greater the probability that party F (and the buyer) is going to win against any opposition. We model this by assuming that if k sellers agree to the buyer's offer (intermediated by party F), then F wins the *interference contest* against A with probability $\pi(k) = k$. The formulation $\pi(k) = k$ is the celebrated Tullock lottery contest success function (see Corchon, 2007).[18]

Post-contest activity and late offers: If party F wins the contest against party A, then these k sellers commit to sell their plots at a price q, and party F leverages its connections (e.g. in the office of land transactions) to ensure that the additional corruption costs r_I are waived. The remaining $1 - k$ fraction of sellers then jointly enter a bargaining process with the buyer that results in a Nash-bargaining outcome on the residual surplus.[19] This determines a plot price q_b at which all remaining plots are sold. As discussed earlier, each such transaction entails a transaction cost r_I due to bureaucratic corruption.

Payoffs of Sellers and the Buyer: If the project fails, then all sellers earn v and the buyer earns 0. Otherwise, if the project goes through and if k plots are acquired through early offers at price q (while the remaining are acquired at the bargaining price q_b), then the buyer's payoff is

$$\lambda - (q + r_P)k - (1 - k)(q_b + \beta r_I),$$

while the payoff to an early seller is q and that to a late seller is $q_b - (1 - \beta)r_I$.

Payoffs of F: In exchange for getting involved in this process and agreeing to implement the buyer's early offer (k, q), party F asks for a political rent of r_P per seller conditional on success. The 'economic rationale' behind this rent lies in the fact that fighting A at the contest stage is costly for party F, both because of opposition from A, as well as because coordinating k sellers is costly, generating a

[17] In our model, geographical connectivity can be implemented for any k given that all plots are identical and sellers are individually insignificant. When this is violated, the problem can become tricky and may require more careful selection and displacement mechanisms to execute partial land sale. For more on this see Ghatak and Ghosh (2011).

[18] In an Online Appendix 8.1 we work out the case for general functions for $\pi(k)$ (as well as $V(x)$) to show existence of holdout.

[19] The modelling assumption here is that party F is not involved in the bargaining process once the interference outcome is decided. This point is discussed in greater details later in Section 3.

cost of $C(k)$ for party F, with $C(k)$ being increasing and convex in k. For presentational clarity and algebraic ease we will work with quadratic costs, in particular the cost function $C(k) = ck^2$ (the main results on existence of holdout reported here go through with general convex cost functions as proved in the online Appendix 8.1). Party F cares not only about its political success, captured by the project's success probability $\pi(k)$, but also its net rental gains $\pi(k)kr_P - ck^2$.[20] Thus the utility of F is given by

$$\gamma\pi(k) + (1-\gamma)[\pi(k)kr_P - ck^2], \tag{1}$$

where $0 < \gamma < 1$ measures how politically important it is for F to acquire land. We assume that the reservation payoff of party F is zero.[21]

Ease of opposition and payoffs of A: From the utility function of F it follows that ceteris paribus, a higher level of c makes it costlier for F to win the political contest. By choosing a higher level of c, party A can therefore ensure that F faces a higher *degree of opposition*. However, increasing c is costly for A and for simplicity we assume that the marginal cost of doing so is constant at $\alpha > 0$. The parameter α is related to *ease of opposition* so that lower values of α makes opposition easier. It has two possible interpretations. First, it is a measure of the robustness of the 'rule of law' in this economy. Thus a higher α means better rule of law as that makes it harder for A to interfere with the process of land transaction once the project passes the interference stage. Alternatively it may mean that A has a smaller presence in the area under consideration (see Section 5.2.1 for more on this) and therefore less influence in the local land related bureaucracy. Like party F, the utility of A also has two parts, the direct political returns from stopping the land acquisition process and the costs incurred in doing so. Thus A's utility is given by

$$\delta(1-\pi(k)) - (1-\delta)\alpha c, \tag{2}$$

where $0 < \delta < 1$ is an index of A's anti-acquisition conviction. A's reservation payoff is assumed to be zero as well.

Timeline: These interactions yield a dynamic game of complete information, denoted by Γ_{α,r_I}, with the following timeline (schematically depicted in Figure 1):

- *Endogenous emergence of interference*:
  - *Stage 1.1*: Party A incurs a cost of αc and announces its level of opposition, c;
  - *Stage 1.2*: Party F selects the rent per seller, r_P, that it demands from the buyer conditional on the project succeeding;
- *Early phase of land acquisition*:
  - *Stage 2*: The buyer announces a plot price q and a fraction k of plots it commits to buy through party F;

[20] One can also consider the case that the buyer needs to pay a part of this rent upfront. This does not affect our results qualitatively as long as party F is a long term player and cares about its reputation.

[21] While we will show that in equilibrium, F will indeed earn a strictly positive payoff, the reservation payoff can in principle be even lower in case there are political costs for F from not participating in this process at all, as we discuss later in the Online Appendix.

– *Stage 3*: Party F incurs a cost of ck^2 to organise k sellers who are willing to sell through F at price of q.

– *Stage 4*: Contest between F and A takes place and the winner is decided; if the winner is A, the game ends and the project is scrapped;[22] if the winner is F, then the project goes through and F is paid the per unit rent of r_P by the buyer;

- *Late phase of land acquisition*:

  – *Stage 5*: All sellers who are yet to sell their plots bargain with B and settle for a price q_b at which all remaining plots are sold after the corruption cost r_I is paid; the game ends.

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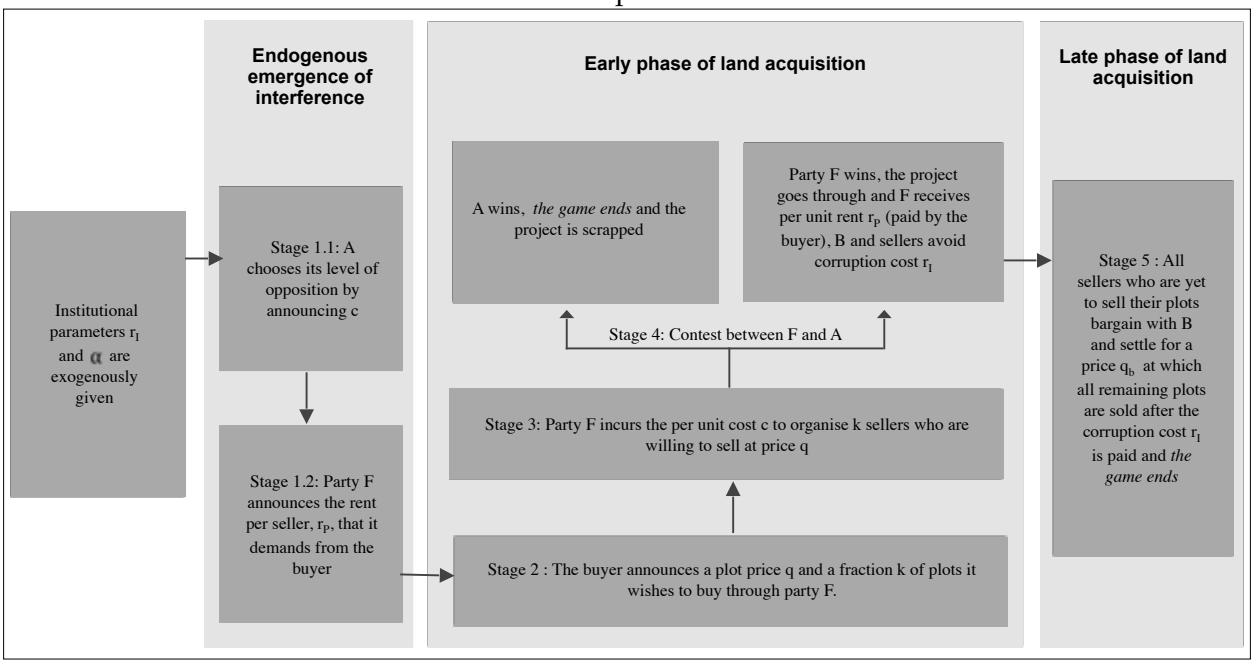

Figure 1: Timeline of the game Γ_{α,r_I}

We next turn to characterising the sub-game perfect Nash equilibrium (henceforth SPNE) outcome of this extensive-form game. In this framework we say that the outcome involves *holdout* if there is a positive probability that the project will be scrapped altogether: larger this probability, greater is the holdout problem.

Definition **1** *We say that Γ_{α,r_I} generates* holdout *of size $1-k$ if sub-game perfect equilibrium of Γ_{α,r_I} involves exactly k fraction of sellers selling their plots in the early phase of the land acquisition process.*

A central objective of this paper is to study conditions under which the interaction between outside interference and bureaucratic corruption results in holdout, and how such interactions shape the size of holdout, the price of land and seller welfare.

[22] To remind the reader, when F loses this contest, the payoffs are: sellers earn v, Buyer earns 0, party F earns $-(1-\gamma)ck^2$ and A earns $\delta-(1-\delta)\alpha c$.

3 Economic activity: prices and sales across phases

In the framework under study, decisions relating to outside interference are made before economic variables like prices and amounts of sales in each period are determined. In this section we will take the interference variables (viz. r_P and c) as well as F's decision to participate as given, and examine the decisions made by the buyer and the sellers across the two phases of land acquisition.

3.1 Late phase of land acquisition

Suppose the game reaches Stage 5 with a fraction $0 \leq k < 1$ of sellers having already sold their plots. The remaining $1-k$ fraction of sellers enter into bargaining with the buyer (although an artefact of our modelling framework, note that since $\pi(0) = 0$, to reach stage 5 with positive probability, it must be that $k > 0$), with the payoffs being the outcome of a symmetric Nash bargaining process involving the buyer on one side, and all remaining $1-k$ sellers on the other. The Nash program is:

$$\max_{q_b \geq 0} [\lambda - (1-k)(q_b + \beta r_I) - \lambda k][(1-k)(q_b - v - (1-\beta)r_I)]. \tag{3}$$

The following lemma is straightforward.

Lemma **1** *In the late stage suppose a fraction $1-k$ of sellers bargain with the buyer to sell their plots. Then the Nash bargaining price $q_b = \frac{v+\lambda}{2} + r_I\left(\frac{1}{2} - \beta\right)$. Consequently, the price q_b is (a) increasing in v and λ, (b) decreasing in β, (c) increasing in r_I iff $\beta < \frac{1}{2}$, and (d) unaffected by α, r_P and k.*

As Lemma 1 indicates, once the project passes through the interference hurdles, the price settlement between the remaining $1-k$ sellers and the buyer is not affected by the fraction k of land sold in the early phase. Neither is it directly affected by the degree of outside interference, but is affected by bureaucratic corruption. We next turn to determining k and the first period price q.

3.2 Early phase of land acquisition: a first look at Holdout

We begin with stage 2 where the buyer must decide on k, the number of plots he would wish to buy during the early phase using party F as an intermediary. Of course, garnering more support for the project through a higher k makes it easier for party F to win the interference game, thereby ensuring that the project goes through. However, the buyer does not want to attract too many sellers in the early phase since these sales must go through party F for which the buyer will have to pay a per unit rent of r_P. Keeping this in mind we now determine the buyers equilibrium choice of the pair (q, k).

For a given choice of k, the buyer needs to offer a price q to implement the desired k. If he offers (q, k) and k sellers agree to sell 'today' at price q, then the payoff of each such seller is $\pi(k)q + (1-\pi(k))v$, whereas the payoff of any seller who delays sale equals $\pi(k)(q_b - (1-\beta)r_I) + (1-\pi(k))v$. Clearly, if he sets a price such that $\pi(k)q + (1-\pi(k))v < \pi(k)(q_b - (1-\beta)r_I) + (1-\pi(k))v$, then the sellers would prefer to wait and he cannot implement k. Thus, he would prefer to set the minimum possible price k such that, $\pi(k)q + (1-\pi(k))v \geq \pi(k)(q_b - (1-\beta)r_I) + (1-\pi(k))v$. Hence for any fixed target k of phase one sellers, we have

$$q(k) = q_b - (1-\beta)r_I. \tag{4}$$

The following lemma is then immediate.

LEMMA **2** *The early and late phase prices of land are, respectively,* $q = \frac{\lambda+v}{2} - \frac{r_I}{2}$ *and* $q_b = \frac{\lambda+v}{2} + r_I\left(\frac{1}{2} - \beta\right)$ *with* $q < q_b$.

Note that q and q_b are neither affected by any of the interference variables r_P and c, nor by the parameters γ and δ, nor by the rule of law (or ease of opposition) parameter α. As we shall later find, the effect of these parameters are manifested only in the probability of holdout, i.e. $1 - k^*$.

Given F's participation and Lemma 2, we now determine the buyer's optimal choice of k. The profit function of the buyer in stage 1 is

$$\Pi(k) = \pi(k)[\lambda - k(q + r_P) - (1 - k)(q_b + \beta r_I)]. \tag{5}$$

Substituting $\pi(k)$, q and q_b in the above expression and simplifying further we obtain

$$\Pi(k) = \frac{1}{2}\left(2(r_I - r_P)k^2 + (\lambda - v - r_I)k\right). \tag{6}$$

Proposition 1 below is our first main result and demonstrates that holdout occurs whenever the political rent r_P is large. This proposition assumes of course that party F participates in the political process. Of course, if c is too high so that F does not find it profitable to participate, then holdout appears trivially as the project gets scrapped with certainty.

PROPOSITION **1** *There is holdout with F's participation in the land acquisition process if and only if the political rent* r_P *is significantly higher than the transactions costs, that is* $r_P > r_I + \frac{\lambda - v - r_I}{4}$. *The number of plots sold in the early stage, i.e.*

$$k^*(r_P) = \frac{(\lambda - v) - r_I}{4(r_P - r_I)}, \tag{7}$$

whenever $r_P > r_I + \frac{\lambda - v - r_I}{4}$, *and* $k^*(r_P) = 1$ *otherwise. Moreover, the size of holdout increases in* v *and* r_P, *but decreases in* r_I *and* λ.

From (7) it follows that in the continuation subgame that initiates economic activities, one obtains holdout in equilibrium whenever r_P exceeds $r_I + \frac{\lambda - v - r_I}{4}$. Why does not the buyer seek to acquire more plots in equilibrium? Intuitively, r_P measures the marginal cost of acquiring one more plot at the early stage, whereas the expression $r_I + \frac{\lambda - v - r_I}{4}$ measures the marginal benefit from doing so at $k = 1$. The expression $r_I + \frac{\lambda - v - r_I}{4}$ is intuitive as the first term, r_I, captures party F's contribution in reducing transaction costs, whereas the second part, $\frac{\lambda - v - r_I}{4}$, is a measure of party F's contribution in fighting A. In case we are in a continuation subgame where the demanded rent r_P exceeds the sum of these two contributions, there will be holdout. With the rent r_P being high, increasing the number of plots acquired is not profitable. Relatedly, why don't more sellers try to bypass the interference process and approach the buyer directly? The benefit of doing so is that she can obtain a higher price, whereas the cost is that she will have to pay the corruption costs herself and increase the probability of the project getting scrapped due to opposition. In equilibrium these two forces are balanced.

Proposition 1 generates several interesting and potentially testable implications. If the locality has land with high value (i.e. v is high), either because of close proximity to a large city, or because

of high fertility of land, then from Proposition 1 (see (7)) it follows that $k^*(r_P)$ is smaller. The effect is similar when the productivity of the industrial project is small. Consequently, Proposition 1 suggests that *urban vicinity, high land-fertility, and/or low project returns all make holdout more likely*. These predictions are also consistent with the basic thesis in Chakravorty (2013) that increased land value was central to the problems of land acquisition.[23]

In Table 1, we look at the pattern of land acquisition bids and their current status – successful, contested or failed – across 15 states and one union territory of India between the years 2006-2016.[24] This table is based on Table 2 in the Online Appendix. Table 2 in turn draws on (a) tables A1 and A2 in Chakravorty (2013) that collate instances of land acquisition that were reported in the media for the first time between the years 2006-2011, and (b) further work by us in July, 2016, that updated the cases that were reported as contested in Chakravorty (2013). It should be pointed out that given that these cases were reported in the media, the sample is likely to be biased towards cases that are 'newsworthy'. Thus, for example, there could be cases where land acquisition went through peacefully during this period, but were not reported by the media (either due to lack of any political interference, or because the amount of land being acquired was not large enough). Nevertheless, the data shows that out of the 53 reported cases, land acquisition was successful in 27 and failed in 7 cases. As of now the other cases either continue to be contested, or there is little evidence to suggest that these have been resolved either way. It is interesting that the data suggests that in the Indian context, land acquisitions, while often contested, and sometimes unsuccessful, also went through in many cases, as suggested by Proposition 1.[25]

3.2.1 A discussion on the modelling assumptions

It is straightforward to demonstrate that our analysis is not dependant on the sellers being risk neutral. All results go through even in the presence of risk aversion.

Next, how critical is the assumption that party F can help with reducing the transactions costs due to bureaucratic corruption? To address this issue, consider a scenario where these transactions costs have to be borne by the buyer and the sellers even if the transactions are mediated by party F. It is straightforward to show that in that case $q = q_b = \frac{v+\lambda}{2} - r_I(\frac{1}{2} - \beta)$, and $k^* = \frac{\lambda - v - r_I}{r_P}$. Thus the results are qualitatively similar in that holdout is still possible.

Finally, as mentioned in footnote 19 earlier, another implicit modelling assumption is that party F is not involved in the late stage of land acquisition. This is motivated by the fact that in this stage party F has much less bargaining power vis-a-vis the buyer (as well as the sellers) as compared to the early stage: with A now defeated, neither the buyer, nor the sellers need the backing provided

[23] In the case of Singur, for example, one of the triggers was that the land was very fertile, implying a very high v. Similarly, in the case of Vedanta, the tribals had a religious and cultural attachment to the proposed cite, which again implies that v is likely to be large. In case of the Jamuna Expressway in Delhi, the land acquisition process encountered several delays as it was hard to satisfy the owners to sell land that was of very high value, owing to the high fertility of land on the banks of the river.

[24] The states reported are Andhra Pradesh, Chhattisgarh, Jharkhand, Gujarat, Goa, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Chandigarh is the only union territory in the data sample.

[25] In spite of the earlier caveat regarding the data (apart from the fact that the data size is also not large), we propose some testable implications of our analysis in Section 5.1.1 and undertake some preliminary eye-balling of the data to check if those hypotheses are clearly rejected or not.

Years	No of land acquisitions	No of unsuccessful (% unsuccessful)	No of contested (% contested)	No of successful (% successful)
2006 - 2016	53	7 (13.21)	19 (35.85)	27 (50.94)

Table 1: The land acquisition status in India for the period 2006-2016.

by party F for the project to go through. Moreover, any further involvement by party F in the process of land acquisition may have costs. For one, rent-seeking even after the interference battle has been won, might cast doubt on party F's credentials as a pro-growth party, creating an adverse reputational effect. Further, for F, the opportunity cost of using up its bargaining chips with the administration in an effort to waive off the corruption costs r_I may be significant. Both these factors assume a greater urgency since getting involved may not yield any further political milage to party F given that the political battle is already won. Given the trade-offs involved, we have chosen to focus on the case where the costs of getting involved outweigh the potential benefits for party F.

It may be of interest though to examine some alternative scenarios where the trade-off is not so adverse for party F, so that it gets involved in the late stage as well. While a complete analysis is beyond the scope of this paper, we discuss some possibilities. Consider a scenario where, following a victory for party F in warding off opposition from A, it can continue demanding a rent in order to allow the buyer and the sellers to bypass bureaucratic corruption and the buyer-seller community has the option to avoid paying this rent and instead incur the corruption cost r_I. Preliminary analysis suggests that our results on holdout go through; however the possibility of rent-seeking opportunity in the late phase has an ambiguous effect on the first period rent r_P when political variables are determined exogenously. Some of the analysis can be found in our Online Appendix (See Section 8.2).

4 Emergence of outside interference

The purpose of the theoretical model goes much beyond Proposition 1, i.e. characterising the existence of holdout. We next embed the model examined in Section 3 in a broader framework and study the effects of changes in the deeper parameters of the environment on the level of holdout, and other variables of interest. In particular, we will be interested in the bureaucratic corruption parameter r_I and the ease of opposition parameter α. In addition, endogenising r_P and c also serves as a robustness check for the preceding analysis. We next turn to a study of these decisions,

beginning with that of the pro-industrial party F.[26]

4.1 Equilibrium rent

To begin with we assume that party F finds it rational to participate. Later in (4.2) we will argue that the equilibrium expected payoff of F will indeed be above its reservation utility, so that it is willing to participate. Suppose A has announced its degree of opposition by committing to some c, where $c \geq 0$. Party F now decides on the rent per seller, r_P, that it would demand from the buyer in order to fight A, taking the level of c as given. The level of r_P will of course determine the number of plots that the buyer will wish to acquire through F's mediation, which is something that party F factors in.

We need some notations before discussing our next result, namely Proposition 2 (to follow). Let r_P^* denote the solution to the F party's problem. Further, let

$$\hat{r}_P := \frac{(1-\gamma)(2c-r_I)(\lambda-v-r_I)+\gamma r_I}{(1-\gamma)(\lambda-v-r_I)+\gamma} \text{ and } \bar{c} := \left(\frac{7}{8}\right) r_I + \frac{1}{8}\left(\frac{\gamma}{1-\gamma}+(\lambda-v)\right)$$

Proposition 2 below solves for the payoff-maximising choice of r_P, showing that, depending on the magnitude of c, the solution may or may not involve holdout.

Proposition **2** *Consider a subgame initiated by A through a choice of opposition level c. Then in the SPNE of this subgame*

(i) if $c \leq \bar{c}$, *then* $r_P^* = r_I + \frac{\lambda-v-r_I}{4}$, *and there is* no holdout,

(ii) whereas if $c > \bar{c}$, *then* $r_P^* = \hat{r}_P > r_I + \frac{\lambda-v-r_I}{4}$, *and there is* holdout.

Proposition 2 is intuitive. Recall that party F derives its utility from two sources, political (defeating A) and economic (net monetary gains from rents). Whenever c, the degree of opposition from A is relatively weak (to be precise $c \leq \bar{c}$), the monetary benefits are sufficiently large so that the political benefits become relatively more attractive at the margin. In that case party F finds it optimal not to raise its demand for rent r_P by so much that the buyer's willingness to acquire land through party F is lowered. Thus it chooses the maximum rent $r_P^* = r_I + \frac{\lambda-v-r_I}{4}$ that ensures that there is no holdout (from Proposition 1 we know that the buyer finds it optimal to set $k^* = 1$). When c exceeds this cutoff, party F finds this low rent unsustainable and raises it beyond $r_I + \frac{\lambda-v-r_I}{4}$. This makes the buyer set a lower k^* and there is holdout.

As this proposition establishes, the degree of opposition c chosen by A is critical to our analysis. The next sub-section is devoted to analysing A's optimal choice of this opposition.

4.2 Equilibrium Opposition

Given that an industrial project may happen, A has to decide on the extent of its mobilisation against this project, i.e. c. This decision is critical to the success of the project as it determines the

[26] An impatient reader may want to move directly to Theorem 1 in Section 4.3 where we summarise the results developed in the next two sub-sections.

rent r_P to be charged by party F and consequently the size of holdout and the probability that the project goes through. If A foresees that conditions are such that the rent charged by party F will be low (so that the buyer will opt to purchase all the plots), it would like to stay away from the contest (by setting $c = 0$). Otherwise it will oppose this project. The conditions that determine the extent of such opposition turn out to depend on the ease of opposition α, as well as δ, the motivation level of party F. Proposition 3 below deals with this. In order to state this proposition, define two critical values, one for the degree of opposition c and the other for the ease of opposition α:

$$c_f := r_I + \sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}} \text{ and } \bar{\alpha} := \left(\frac{\delta}{1-\delta}\right)\left(\frac{\lambda - r_I - v + \frac{v}{1-\gamma}}{(\lambda - r_I - v + \frac{\gamma}{1-\gamma})^2}\right).$$

Proposition 3 shows that there is holdout if and only if $\alpha < \bar{\alpha}$ and δ is sufficiently large.

Proposition **3** *In the SPNE of Γ_{α,r_I}, the following hold:*

(i) Suppose opposition is sufficiently difficult, formally $\alpha \geq \bar{\alpha}$. Then there is no opposition in equilibrium, i.e. $c^* = 0$.

(ii) On the other hand if $\alpha < \bar{\alpha}$ so that opposition is not very difficult, then there exists $0 < \tilde{\delta} < 1$ such that if $\delta \leq \tilde{\delta}$ then $c^* = 0$, while if $\delta > \tilde{\delta}$ then $c^* = c_f$, with c_f being

(a) increasing in λ and decreasing in v and α;

(b) decreasing in r_I if and only if $(\lambda - v) - r_I$ is sufficiently high.

As is clear from Proposition 3, the fragility of the rule of law and/or strong local presence of A – as captured by a small α so that ease of opposition is high – is of primary importance to A's decisions. If α is very high, A finds it optimal to not oppose at all. This is because to generate any delay via holdout, r_P has to be very large, which requires the level of c itself to be very high as well. With a large enough α this becomes unsustainable for A. While setting a high c becomes feasible for A when α falls, it should also be sufficiently motivated (that is δ should be sufficiently large). We have characterised a threshold value $\tilde{\delta}$ (obtained from (18) in the Appendix) such that A mounts significant opposition and there is holdout only when the marginal returns from this opposition is large ($\delta > \tilde{\delta}$).

The interesting case is naturally when the parameters of the model allow for hold out. Now that we know the equilibrium amount of opposition $c^* = c_f$ in such situations, we use Propositions 1, 2 and 3, to compute the 'overall' equilibrium demand for rent that induces holdout in the economy. Corollary 1 deals with this.

Corollary **1** *Suppose $\alpha < \bar{\alpha}$ and $\delta > \tilde{\delta}$ so that there is holdout. Then the equilibrium rent r_P^* is given by*

$$r_P^* = \frac{(1-\gamma)\left(r_I + 2\sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}\right)(\lambda - v - r_I) + \gamma r_I}{(1-\gamma)(\lambda - v - r_I) + \gamma}, \tag{8}$$

where r_P^* is

(i) monotonically increasing in λ and monotonically decreasing in v and α;

(ii) increasing in r_I if $(\lambda - v) - r_I$ is sufficiently high and decreasing otherwise.

It is straightforward to see that the rent per seller r_P charged by F is increasing in λ, and decreasing in α. Consider an increase in v. Following this, the buyer's initial price offer q (as well as q_b) must rise. This becomes economically infeasible for the buyer unless F provides room for the buyer by reducing r_P. These forces work in the exact opposite direction when λ increases. Hence for projects where land has high marginal productivity, rents are high as well. We now address the non-monotonicity of equilibrium rent in the degree of bureaucratic corruption r_I. Suppose r_I is large so that $(\lambda - v) - r_I$ is small. A further increase in r_I makes it too attractive for the buyer to buy out more plots today as a rise r_I increases the gap between q and q_b significantly (see Fig. 2 below). This increase in demand for F-administered sale gives room to party F to finance its war against A and earn enough returns from it so that it finds optimal to increase this demand optimally through a reduction in rent. On the other hand when r_I is small so that $(\lambda - v) - r_I$ is sufficiently high, the buyer does not dislike second period purchase except that it still requires a sufficient amount of F-administered sales in order to overcome the period 1 political hurdle. Party F can therefore coerce the buyer with a higher rent knowing that this would not force the buyer to reduce first period purchase significantly.

Finally we demonstrate that Party F's equilibrium payoff is positive, so that F finds it optimal to participate. Note that F's payoff is zero at $k = 0$ and is increasing in k whenever $r_P > c$. In equilibrium, $c^* = c_f$ and $r_P^* - c_f$ simplifies to

$$r_P^* - c_f = \frac{(3(1-\gamma)(\lambda - v - r_I) + \gamma)\left(\sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}\right)}{(1-\gamma)(\lambda - v - r_I) + \gamma} > 0$$

since $0 < \gamma < 1$, $0 < \delta < 1$ and $\lambda > v + r_I$.

4.3 Equilibrium holdout

We are now in a position to report the equilibrium of the full game by collecting the analysis in Sections 3, 4.1 and 4.2 in the following theorem.

Theorem **1** *Let k^* denote the equilibrium fraction of land acquired through the intermediation of party F.*

(i) $k^* = 1$ if either (a) $\alpha \geq \bar{\alpha}$, or (b) $\alpha < \bar{\alpha}$ and $\delta \leq \tilde{\delta}$; otherwise $k^* = \frac{(1-\gamma)(\lambda - r_I - v) + \gamma}{8(1-\gamma)(c_f - r_I)} < 1$.

(ii) In the early phase, the fraction k^* of land is sold at price $q = \frac{\lambda + v}{2} - \frac{r_I}{2}$. In case party F wins the political contest against party A, then the remaining plots are sold in the late phase at price $q_b = \frac{\lambda + v}{2} + r_I(\frac{1}{2} - \beta)$; thus $q_b = q + r_I(1 - \beta)$ so that $q < q_b$ for all $0 < \beta < 1$.

Theorem 1 provides an overview of the study so far. If it is hard for A to oppose, i.e. α is high, or A's ideological drive against industrialisation is not too strong, i.e. δ is small, then A will not oppose land acquisition at all. In that case the rent demanded by party F is small, thus the buyer buys all land using party F and the project takes place with probability 1. Otherwise, A offers significant opposition to land acquisition, which forces party F to charge larger rents. This

induces the buyer to acquire a smaller fraction of plots through party F, thereby opening up the possibility of A winning the political contest with F and stalling the project. In such a situation, the price offered in the initial phase, i.e. q, is smaller than the eventual price q_b. Interestingly, all sellers end up with equal payoffs irrespective of whether the project is stalled (in which case each earn v) or whether it goes through (in which case early phase sellers earn q while the late phase sellers earn $q_b - r_I(1-\beta)$ where equilibrium equalises these two quantities). However, there is land-price dispersion that increases with the degree of bureaucratic corruption (as is evident from Figure 2) but remains unaffected with ease of opposition unless the ease of opposition is small (viz. α large) in which case all land is sold at a single price. As expected of course, the degree of price dispersion is also affected by the bargaining power of the buyer vis-a-vis the sellers once they are free to negotiate the price without involving party F. In particular, as the sellers' power increases, the price dispersion increases.

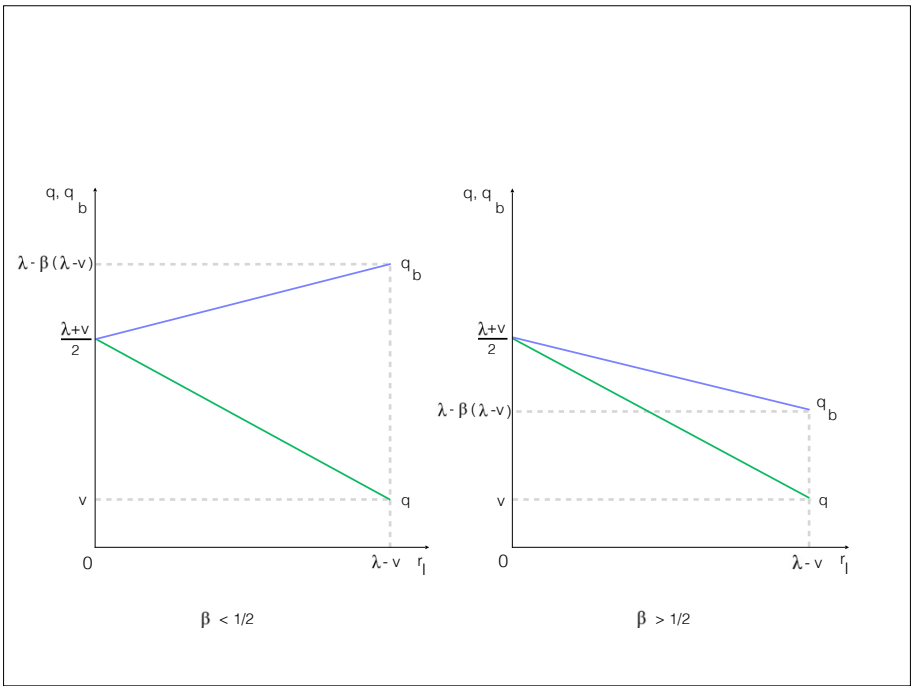

Figure 2: Effect of change in r_I on price of land (q and q_b)

Note that Theorem 1(i) suggests that not all land acquisition processes lead to external opposition. There was none when the West Bengal government, then led by the Left Front, acquired 217.23 acres of mono-crop land in Kharagpur to build a pig-iron manufacturing plant by Tata Metaliks (Guha, 2007). Even media coverage did not provoke any opposition in support of the unwilling farmers. Considering the period 1994-2004, Guha (2007) argues that more than 70 percent of the displaced farmers were not properly rehabilitated and left with little monetary compensation. There were some local protests from the landowners when the state government proposed to acquire another 525 acres of farmland in the same area, but these protests fizzled out due to the lack of strong political backing (Guha, 2007). In fact, even at the time the Singur agitation was alive, the Jindal group of companies managed to acquire land for their factory in West Bengal without

any political intervention or ex.[27] Further, in certain states of India like Gujarat, land acquisition, even in the absence of government intervention, seems relatively trouble free.[28] What can one say about conditions required for holdout to be absent in equilibrium? We have proved that if $\alpha \geq \bar{\alpha}$ or $\delta \leq \tilde{\delta}$, then there is no opposition ($c^* = 0$), and so there will be no outside interference. These conditions that thwart opposition turn out to be both necessary and sufficient to have no holdout in equilibrium.

4.3.1 Coercive pro-industrial party F: a digression

The above framework assumes that sellers are free to decide whether they want to sell their plots through party F, or wait and negotiate directly with the buyer once all interference hurdles are overcome. Note though that in our framework, party F has a strong incentive to coerce sellers to sell their plots early since, with more first period sales, the probability of victory increases for party F. Such coercion is widespread; there are many instances around the world where landowners were threatened by a political party to sell their lands.[29] How would this possibility affect the equilibrium variables like rent, degree of opposition, price of land and the magnitude of holdout?

To address this issue, we look at a simple extension of our model where refusal to participate in the first period offer (q, k), if approached by party F, results in a *personal penalty* of amount $\chi > 0$ to the seller.[30] Given our discussions above, it is only natural to assume that in an LDC, party F is typically endowed with the required political and state machinery to execute this threat costlessly.

Proposition 4 (see the Appendix) is a detailed report on the equilibrium under this possibility and shows that while in equilibrium coercion will not be executed, credibility of the threat itself will affect the size of holdout and price of land. This is because the buyer incorporates this aspect in his first period offer that makes the early sellers exactly indifferent between selling and refusing to do so, and then waiting to negotiate with the buyer. This of course affects the first period price which now depends upon both χ, as well as the amount of first period sales k (see Figure 5 in the Appendix). In particular, this makes the relationship between the early phase price q and the size of bureaucratic corruption r_I non-linear. Otherwise, the possibility of coercion is analytically similar to the effect of a 'jump' in the value of λ in the baseline framework (without coercion). It is this jump-effect that yields the interesting result that *size of coercion may both increase or decrease the size of holdout* (driven by the fact that size of coercion is non-monotonic in λ (see Corollar 2 below).

[27] See <http://archive.indianexpress.com/news/unlike-singur-salboni-farmers-look-forward-to-land-acquisition–/33349/2> and <https://www.ukessays.com/essays/history/study-of-salboni-land-acquisition-history-essay.php>, accessed on 24.4.2016.

[28] See<http://www.business-standard.com/india/news/land-acquisition-in-gujarat-less-bloody/377151/>, accessed on 23.4.2016.

[29] The recent verdict by the Supreme Court of India is suggestive of coercive land sale in Singur. See for example <http://timesofindia.indiatimes.com/india/Supreme-Court-raises-questions-on-Singur-land-allocation-for-Tata-Motors/articleshow/52134670.cms>.

[30] The analysis goes through without any modifications even if we assume that in case of even a single offer being refused, all the villagers would be punished. In this context we note that in Singur, the then industries minister of West Bengal threatened to cut off all developmental works in this region, which is a group penalty rather than a private one. See http://www.mainstreamweekly.net/article101.html.

5 Impact of corruption and ease of opposition on holdout, seller welfare and economic surplus

We are now in a position to examine the impact of changes in the deeper parameters of our framework, namely the degree of bureaucratic corruption and ease of opposition, on the key economic variables in our framework. While the sizes of these important parameters (viz. α and r_I) are not expected to change significantly in the 'short run', they may undergo small improvements or deteriorations. We now ask how small changes in these parameters affect the degree of hold out, welfare of the sellers and the overall economic surplus from land acquisition for industrial growth. *Inter alia*, we shall also develop some testable implications of our analysis, and take a first cut at taking these hypotheses to data.

5.1 Impact on holdout

Consider an economy where current levels of bureaucratic corruption and ease of opposition result in hold out. How does an improvement in either of these parameters affect the extent of holdout that makes the process of industrialisation uncertain? Theorem 2 deals with this.

Theorem **2** *Suppose that $\alpha < \bar{\alpha}$ and $\delta > \tilde{\delta}$, so that there is holdout in equilibrium.*

(i) The magnitude of holdout, i.e. $1 - k^*$, is non-monotonic in the level of bureaucratic corruption, i.e. r_I; to be precise, $1 - k^*$ is increasing in r_I if $r_I < (\lambda - v) - \frac{\gamma}{1-\gamma}$, but is decreasing in r_I otherwise.

(ii) The magnitude of holdout decreases monotonically with a decrease in the ease of opposition, i.e. an increase in α.

(iii) Further, if $r_I < (\lambda - v) - \frac{\gamma}{1-\gamma}$ so that a fall in corruption reduces holdout, a simultaneous fall in ease of opposition dampens this reduction; if $r_I > (\lambda - v) - \frac{\gamma}{1-\gamma}$ so that a fall in corruption increases holdout, a simultaneous fall in ease of opposition dampens this increase. Formally, $\frac{\partial(1-k^*)}{\partial r_I} > 0$ if $\frac{\partial^2(1-k^*)}{\partial \alpha \partial r_I} > 0$, while $\frac{\partial(1-k^*)}{\partial r_I} < 0$ if $\frac{\partial^2(1-k^*)}{\partial \alpha \partial r_I} < 0$.

Theorem 2(i) shows that while an increase in bureaucratic corruption r_I increases holdout when r_I is small, it decreases holdout when r_I is large, so that the impact is non-monotonic. Why does the effect of a change in r_I depend upon whether corruption is large or small to begin with? Suppose bureaucratic corruption r_I increases. From Proposition 1, note that the direct effect of this change in r_I will be to increase holdout. Moreover, there is an indirect effect stemming from the fact that an increase in r_I induces party F to reduce the political rent charged by it, and consequently induces A to reduce the level of its political opposition c. This reduces the political space available to party F, and increases that for party A, so that holdout would tend to decrease. When party F is very highly motivated relative to the net returns from the project, i.e. $\lambda - r_I - v < \frac{\gamma}{1-\gamma}$ (which is likely to be the case for LDCs where r_I can be expected to be large), then the indirect effect will be large enough to overturn the direct effect, so that holdout decreases. Otherwise, the direct effect dominates, so that holdout increases.

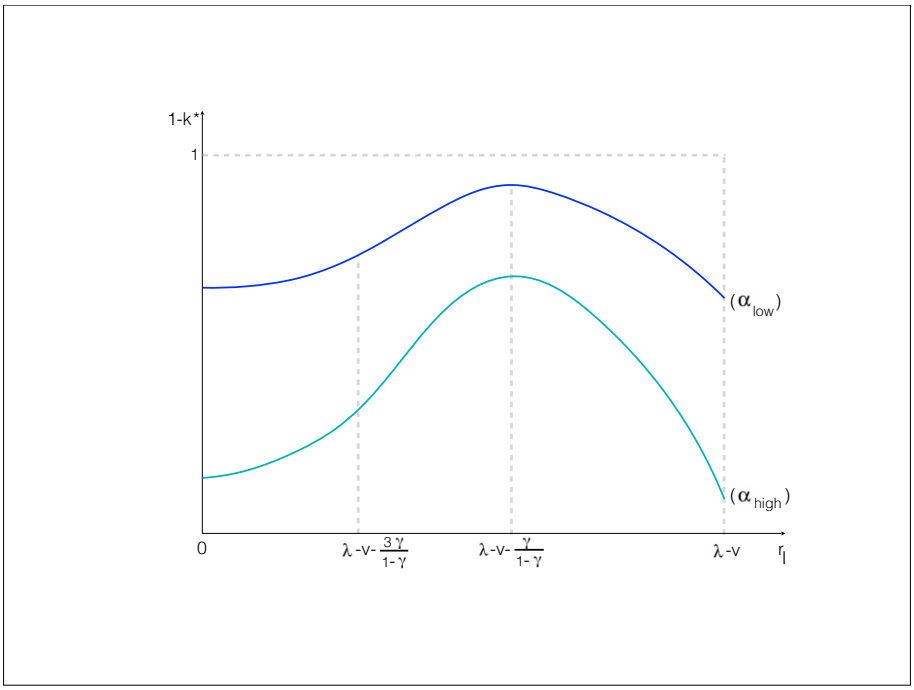

Figure 3: Size of holdout (viz. $1-k^*$) as a 'function' of degree of corruption r_I and ease of opposition α.

An increase in α on the other hand reduces the space for opposition since it increases the marginal cost of increasing c. Theorem 2(ii) suggests that this would reduce the magnitude of holdout, which is expected.

Theorem 2(iii) then demonstrates that the effect of a change in r_I on holdout is always enhanced when α increases. Thus, if there is a lot of existing bureaucratic corruption in the system (i.e. r_I is large), then reducing corruption increases holdout to a greater extent if the rule of law is robust so that opposing land acquisition is costly. Whereas if there is not much existing bureaucratic corruption in the system (i.e. r_I is small), then reducing corruption further reduces holdout to a greater extent if the rule of law is robust. Figure 3 provides a graphical representation of Theorem 2, plotting the relation between $1-k^*$ and r_I for two values of α, where the observed inflection point at $\lambda - v - \frac{3\gamma}{1-\gamma}$ is easy to establish.

Finally, note that Theorem 2(i) and (ii) are both critically dependent on the fact that interference is endogenous. In case r_P and c are taken to be exogenous, then Proposition 1 shows that an increase in bureaucratic corruption necessarily increases holdout, which is exactly the reverse of our result in case of LDCs. Further, with an exogenous r_P and c, the level of holdout does not depend on α at all. Corolloary 2 is immediate and mimics the arguments in Theorem 2.

COROLLARY **2** *The level of holdout $1-k^*$ is decreasing in γ, but increasing in δ. Further, $1-k^*$ decreases with λ and v if and only if $r_I < \lambda - v - \frac{\gamma}{1-\gamma}$.*

5.1.1 *Testable hypotheses and some evidence from India*

Theorem 2 generates two testable hypotheses that can be taken to data, at least conceptually:

> *Hypothesis 1*: An increase in bureaucratic corruption, i.e. in r_I, increases holdout if the economy is relatively developed, i.e. the existing value of r_I is relatively small, but decreases holdout if the economy is underdeveloped, i.e. r_I is relatively large to begin with.
>
> *Hypothesis 2*: An increase in the ease of opposing land acquisition, i.e. a decrease in α, increases holdout.

For a less developed economy like India, one would expect that bureaucratic corruption (viz. r_I) is large enough to begin with across all states. Our theory then predicts that, *ceteris paribus*, the level of holdout would be lower in states within India where corruption is relatively higher (viz. Hypothesis 1), and that holdout should be more in states where it is relatively easier to organise opposition (viz. Hypothesis 2). We then attempt to take these hypotheses to data. While the lack of systematic data on land acquisition in India makes this a difficult task, the objective behind this exercise is to simply check if the data rejects these hypotheses outright or not.

To that end we look at the *unconditional correlations* between corruption (viz. r_I), the ease of opposition (viz. α) and holdout (viz. $1 - k^*$) in India. We proxy bureaucratic corruption by the perception of corruption, in particular that held by those below the poverty line in various Indian states regarding the respective land administrative departments.[31] We take a simple average of this perception in the two years 2005 and 2008 (viz. "avgcorrup2005and2008per" in Figure 4), so that a higher value of "avgcorrup2005and2008per" reflects a higher value of r_I. On the other hand, ease of opposition (viz. α) is a more difficult variable to capture and track. We proxy for it by the (log of) total number of deaths due to political violence across the concerned states and union territories between the years 1960 - 2004 (viz. "inpolviototalhist" in Figure 4).[32] The idea is that if a state has a history of higher political violence, it suggests that institutions in these states are not effective enough in dealing with protests in general. Further, given that institutions change relatively slowly, this difference across states should persist over the period we are interested in. Thus a higher value of "inpolviototalhist" reflects a lower value of α.

Finally, in order to obtain a measure of holdout, we use Table 2 (in the online Appendix) – which reports on the status of land acquisition cases in India reported in the media between 2006-2011[33] – to construct a discrete variable (viz. "landacqstatus" in Figure 4) with 0 denoting

[31] In the states, households below the poverty line were asked if "There is corruption in land records and registration services department" in the years 2005 and 2008. The perception of corruption is measured as a percentage response to this question. This data is from the India Corruption Study - 2005, and the India Corruption Study - 2008, Transparency International India, with a number of districts within the states being selected for conducting the sample survey. The link for the 2008 study is: < http://www.transparencyindia.org/resource/survey_study/India%20Corruptino%20Study%202008.pdf>; whereas that for the 2005 study is:
< http://www.transparencyindia.org/resource/survey_study/India%20Corruption%20Study%202005.pdf>.

[32] The data is from the India Sub-National Problem Set database, 1960 - 2004, from the Center for Systematic Peace, USA, 2005: http://www.systemicpeace.org/inscrdata.html.

[33] See the discussion around Table 1 in Section 3.2 earlier for a short description of the data.

success, 0.5 denoting contested, and 1 denoting failure in land acquisition. Thus, a higher value of "landacqstatus" reflects a higher value of $1 - k^*$.

We use the locally weighted scatterplot smoothing (LOWESS) to decipher the correlations between holdout, corruption and ease of opposition in a non-parametric fashion.[34] In the left

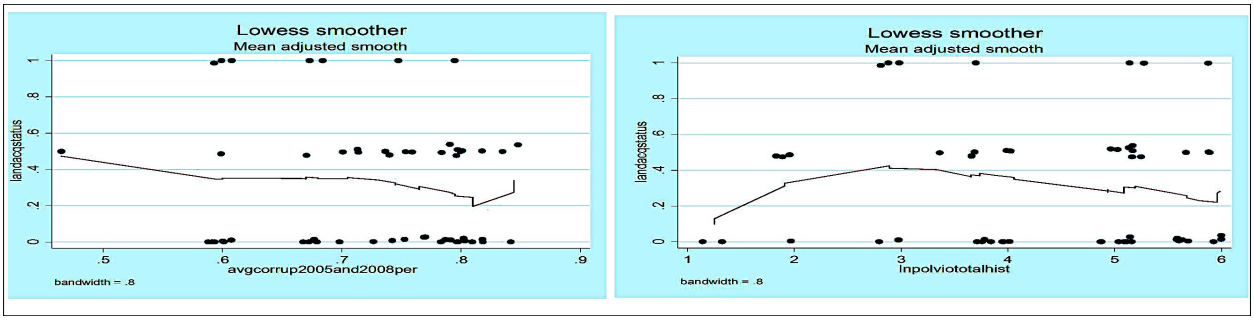

Figure 4: Evidence on how bureaucratic corruption (left panel) and ease of opposition (right panel) have differential impact on holdout (viz. y - axis) across 15 states and one union territory of India over the period 2006-2016.

panel of Figure 4, the mean adjusted LOWESS smoother between holdout and corruption shows that with an increase in the average perception of corruption, there is a steady decline in holdout up to a value of 0.8, and it is increasing in the level of corruption thereafter. In the right panel, the LOWESS smoother between holdout and our proxy for ease of opposition demonstrates that with an increase in ease of opposition (that is a fall in α), holdout increases initially and shows a declining trend thereafter.[35]

While interpreting this evidence we should note that the LOWESS smoothers are bi-variate in nature so that the evidence we provide do not represent conditional correlations that can be estimated econometrically. Modulo this caveat however, it would seem that the data is roughly consistent with Hypotheses 1. On the other hand, Hypotheses 2 appears to find less support. It finds support only when comparing across states where it is generally hard to organise opposition, so that "inpolviototalhist" is small, in particular it is less than 0.3. One reason could be that the political violence measure used here is conflating two different aspects of political violence; while it captures the ease of opposition, which would tend to increase holdout, it may also capture the ease of coercion, which would tend to decrease holdout, rendering the net effect ambiguous. The theory presented here largely bypasses this possibility. In future work, we plan to extend the theory so as to allow for this and also take up the issue of empirically testing more nuanced versions of these two hypotheses in greater depth.[36]

[34] This non-parametric technique is particularly useful given our small sample size as it does not impose any a priori distribution on the data set.

[35] As a robustness check, we also estimated the LOWESS smoother against the log of the total number of political deaths between the years 1990-2004. The shape of the LOWESS smoother appears to be very similar in this case.

[36] We have estimated a number of empirical specifications using panel least squares techniques and the results suggest that holdout is decreasing in the level of corruption. The findings are available on request.

5.2 Impact on seller utility

We next turn to an analysis of how changes in the degree of bureaucratic corruption and ease of opposition affect the welfare of the sellers. Recall that the equilibrium payoff of the local landowners under holdout (denoted by U_S below) is simply a markup over and above their reservation utility v.[37] To be precise,

$$U_S = \frac{\sqrt{2}((1-\gamma)(\lambda - r_I - v) + \gamma)}{4(1-\gamma)\sqrt{\frac{\delta(\lambda - r_I - v)}{\alpha(1-\delta)}}}\left(\frac{\lambda - v - r_I}{2}\right) + v. \tag{9}$$

Given the expression for U_S in (9) it follows immediately on the other hand that $\frac{\partial U_S}{\partial \alpha} > 0$. This means that sellers would want α to be as high as possible.

We also find that a fall in bureaucratic corruption unambiguously benefits the sellers. In particular,

$$\frac{\partial U_S}{\partial r_I} = -\frac{\sqrt{2}(3(1-\gamma)(\lambda - r_I - v) + \gamma)}{16(1-\gamma)\sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}}} < 0. \tag{10}$$

Interestingly, the result in (10) obtains despite the facts that (i) a higher corruption always reduces period 1 prices q, (ii) its impact on period 2 price q_b depends upon the relative bargaining powers of the buyer and the sellers, and (iii) its impact on holdout depends upon the net productivity of the project. In the Online Appendix we demonstrate that this result is critically dependant on the fact that interference activity is endogenised. We show that the result may in fact be reversed if this activity is frozen, in that an increase in r_I increases seller utility whenever the political rent paid to F is at an intermediate level! This underscores why it is important to explicitly model interference in this context.

We then discuss some additional nuances dealing with seller utility. Section 5.2.1 below shows that all landowners prefer that A exists, rather than it does not. At the same time, however, they do not like it to be too powerful, i.e. they don't want α to be too small.

5.2.1 On existence (and strength) of opposition and coercive F

Do the sellers benefit from, or are harmed by the presence of party A that opposes land sale? Suppose A's presence allows sellers to bargain in stage 2. Suppose in such a framework, A is absent. Then the buyer's choice is simple: if he involves F, then he offers v to each seller and the buyer's total cost is $v+r_P$; if he does not involve F then the buyer's total cost is $v+(1-\beta)r_I+\beta r_I = v+r_I$. The F party knowing this demands $r_P = r_I$ so that each seller receives v. Since in our baseline model price is more than v, it follows that A's presence is good.

Next suppose that sellers can bargain even if A is absent. Suppose A is absent and party F announces an r_P to be paid by a buyer who wants to purchase land through party F. The minimum

[37] In particular, the ex-ante payoff of a generic seller is $\pi(k)(kq + (1-k)(q_b - (1-\beta)r_I)) + (1-\pi(k))v$. Upon substitution of equilibrium values, we obtain (9). This payoff is $\frac{\lambda+v}{2} - \frac{r_I}{2}$ when there is no holdout. When there is holdout, then recall from Proposition 3 that it must be that $\alpha < \bar{\alpha}$ and $\delta > \tilde{\delta}$. Then we get $k^* = \frac{\sqrt{2}((1-\gamma)(\lambda - r_I - v)+\gamma)}{4(1-\gamma)\sqrt{\frac{\delta(\lambda - r_I - v)}{\alpha(1-\delta)}}}$, $c^* = c_f$ and $r_P^* = \hat{r}_P$.

land price the buyer can offer at this stage is v. Of course the buyer will involve party F if and only if $v + r_P \leq q_b + \beta r_I$, otherwise he will directly bargain with the sellers for a unit price of land. Knowing this, F sets $r_P = q_b + \beta r_I - v$ if it is positive. But q_b is as given in Section 3 and so replacing it in the RHS we obtain $r_P = \frac{\lambda - v + r_I}{2}$ which is strictly positive given our assumptions. Thus, the price of land without A is simply v. Arrival of A raises this price as both q and q_B are higher than v. To see this, since $q < q_B$ it suffices to note that $q = \frac{\lambda + v - r_I}{2} > v$ since $\lambda - v - r_I > 0$. So opposition raises prices and therefore A has an indirect positive impact on the villagers; of course it also increases the chances of no sales at all. One can now compute the equilibrium expected benefit of A for the sellers, but since cancellation of the project yields v to each seller, introduction of A necessarily increases villagers' welfare as well. It is interesting to note that in this model although sellers want to sell – provided party F is not coercive – and A opposes any sale of land, this opposition is unambiguously liked by the sellers, ex-ante, irrespective of whether or not A's presence provides the sellers with some bargaining power. As alluded to before, α can also be seen as a proxy for A's local presence. Given $\frac{\partial U_S}{\partial \alpha} > 0$, this means that sellers would want α to be as high as possible.

Put together, this suggests a non-monotonic seller preference for opposition given that party F exists. Interestingly, although sellers like the presence of A when their bargaining power stems from the presence of A, it turns out that they never want it to be too powerful. What if party F did not exist? Then no acquisition would take place if A still existed and in our framework that is strictly worse as discussed above. Finally if both parties were absent, then land acquisition would be fully successful but sellers would be made indifferent between selling and not so that their payoff would be v which is again strictly less than what they obtain in our equilibrium. Hence *outside interference in general is beneficial to the sellers*. This conclusion is irrespective of the size of bureaucratic corruption.

In Section 4.3.1 we have seen that when party F has the ability to coerce unwilling sellers, hold out may fall, as does the early phase price, i.e. q. While a reduction in holdout increases the probability that the project clears the interference hurdles and thereby increases expected seller utility, a fall in period 1 price hurts this welfare. What is then the net effect on seller welfare? We show in the Appendix that in the presence of coercion, the existence of party F is a mixed blessing for the sellers. While they dislike coercion, the presence of party F does help with getting the project through. One can then easily show that there exists a unique $\bar{\chi}$ such that if $\chi < \bar{\chi}$, then sellers prefer to have F even if it is coercive; but if $\chi > \bar{\chi}$, then they prefer not to have a party F to having a coercive F.

5.3 Impact on economic surplus

We next turn to analysing the effects of changes in corruption and ease of opposition on the *economic surplus* (ES) from land acquisition, where the ES is the sum of the buyer's utility U_B and the seller's utility U_S, net of monetary costs $(1 + \alpha)c^*$ incurred by the society due to outside interference. Since $(1 + \alpha)c^*$ is a deadweight loss to the society, we have

$$ES(\alpha, r_I|\lambda, v) = U_B + U_S - (1 + \alpha)c^*, \tag{11}$$

where, the buyer's payoff is

$$U_B = \pi(k)(\lambda - k(q + r_P) - (1 - k)(q_b + \beta r_I)).$$

Assuming that there is hold out, we have

$$U_B = \frac{\sqrt{2}((1-\gamma)(\lambda - r_I - v) + \gamma)}{8(1-\gamma)\sqrt{\frac{\delta(\lambda - r_I - v)}{\alpha(1-\delta)}}} \times$$

$$\left(\frac{\sqrt{2}((1-\gamma)(\lambda - r_I - v) + \gamma)}{2(1-\gamma)\sqrt{\frac{\delta(\lambda - r_I - v)}{\alpha(1-\delta)}}} \left(r_I - \frac{(1-\gamma)\left(r_I + 2\sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}\right)(\lambda - r_I - v) + \gamma r_I}{(1-\gamma)(\lambda - r_I - v) + \gamma} \right) + (\lambda - r_I - v) \right),$$

and $c^* = c_f > 0$.

An important distinction between developed and under-developed economies is that both higher corruption and easier opposition, particularly through unconstitutional means such as armed agitation, are expected to be less in the former. Keeping this distinction in mind, how do the impacts on surplus compare across the developing and the developed world? The impacts of r_I and α on the sellers' utility U_S is straightforward as shown in subsection 5.2 above. Their impacts on the degree of opposition (that determines the deadweight loss to the society due to interference) is also relatively simple as summarised in Proposition 3 (that characterises the equilibrium degree of opposition c^*). However their impacts on the buyer's utility U_B depends on a far more complex interplay between the preference parameters of the interfering parties (viz. γ and δ) and the economic parameters of the industry and land use (viz. λ and v). The extent of this complexity is worsened by the fact that k^* and r_P^* are non-monotonic in r_I so that a general analysis of surplus becomes uninformative.

To obtain some clear insight with respect to the questions we ask above, we make the following simplifications. We set $\lambda = 2$ and $v = 1$ (so that industry is twice as productive as agriculture) that also means that the maximum degree of corruption is normalised to 1 (viz. $r_I \leq 1$) to keep the problem interesting. Further, we focus on a benchmark case where the relative weights on motivation and economic returns are balanced for the interfering parties, i.e. $\gamma = \delta = 1/2$. Observation 1 below is the central result of this sub-section (the proof is moved to the Online Appendix).

Observation **1 (**Immiserising Reforms**)** *Suppose that $\lambda = 2$, $v = 1$ and both parties have balanced preferences, i.e. $\gamma = \delta = 1/2$:*

(i) The economic surplus is increasing in r_I if α is high, and is decreasing in r_I otherwise.

(ii) The economic surplus is increasing in α if r_I is small, and is decreasing in α otherwise.

As argued earlier, both higher corruption and easier opposition are expected in an LDC. Observation 1 then suggests that, in an LDC, economic surplus would decline with an improvement in both (i.e. a decline in r_I and an increase in α), whereas the results are reversed in case of a developed nation. What is the basic intuition? Consider a drop in bureaucratic corruption in an LDC, where r_I has been large, and α is small. The decline in economic surplus is driven primarily by the fact that in this case holdout is going to increase (see Theorem 2(i)), which in turn is driven by the presence of adversarial interference, as brought out in the discussion following this

theorem. Whereas if the rule of law is strong so that opposing acquisition is costly, then the extent of opposition will be insignificant, so that there is little or no holdout. In that case, a decline in r_I will only have a direct effect in reducing corruption costs, so that the economic surplus increases. Further, given that there is little holdout, the direct impact of a decline in r_I is more in effect as it is spread over many more sellers. The intuition for the effects of a change in α is similar.

Observation 1 has interesting implications. Given that in less developed economies it requires a *deterioration* in the quality of institutions in order to make short term improvements in economic surplus, these economies might be in a trap in that they may have little incentive to encourage institutional reforms in the short-run and instead wait for a 'big push' that never comes by. For developed economies however the scenario is reversed, and they can improve their economic surplus by improving both political and legal institutions. Again this result is critically dependent on the fact that the level of interference is endogenous. In the Online Appendix we show that keeping interference exogenous can yield misleading conclusions.

While the possibility that institutional improvements could have an immiserising effect in LDCs come out starkly in the benchmark reported in Observation 1, this need not be a universal phenomenon. For example, one can show that when A is extremely motivated, and party F is highly rent-seeking, reducing corruption hurts short term economic surplus only if existing corruption is high compared to the ease of opposition. Similarly, reducing the ease of opposition can hurt short term economic surplus only if opposing is currently easy compared to current level of corruption (see Online Appendix 8.3 where we collect these two cases under Observation 5). Nonetheless, the possibility of immiserising institutional improvements in LDCs holds for a large class of parameter values, even if it is not universal.

6 Conclusion

We develop a theoretical framework that allows us to study how institutional infirmities, in particular bureaucratic corruption and extra-legal outside interference from political parties (and motivated civil society organizations), affect land acquisition. We characterise conditions under which these imperfections generate holdout, so that the acquisition of land is cancelled with a positive probability. Further, we demonstrate that urban vicinity, high land-fertility or low project returns, all add to the chances that outside interference of this nature will cause holdout. In addition, whenever there is holdout, one also obtains dual pricing of land in that the price of land sold during the early phase of the acquisition process is necessarily lower than what sellers obtain at a later stage. Moreover these results are qualitatively robust to whether there is coercion by political parties or not.

Interestingly an increase in bureaucratic corruption has a non-monotonic effect on several measures of economic efficiency, in particular holdout and the economic surplus. We find that if institutions are weak to begin with, which is likely in LDCs, then a decrease in corruption may, in fact, increase holdout, and consequently reduce economic surplus, a phenomenon we call immiserising reforms, suggesting that LDCs may not have too much of an incentive to focus on institutional improvements. With an decrease in bureaucratic corruption, selling via party F is less attractive for the buyers, thus reducing party F's political clout, which in turn may increase holdout. When it comes to seller welfare we find that an increase in bureaucratic corruption always

makes them worse off; however, while the sellers prefer that the opposition party be there, they also prefer that this opposition is not too strong.

We then discuss several aspects of the land acquisition process we have abstracted away from till now. We have assumed that the reservation utility from land is identical for all sellers. In reality, although one would not expect too much of a variation (since geographic vicinity largely determines the quality of land and thus plot value), there may be instances where this is violated. In that event one interesting issue is whether the buyer would target high yield plots for early acquisition through politics, leaving low yield plots for laissez-faire bargaining, or the other way around. Another important theme is the uncertainty that poor landowners face when they sell their plots and look beyond traditional means of livelihood. One can incorporate this aspect in our framework by assuming that the buyer will have to compensate for this additional cost borne by sellers. Hence all our results will go through qualitatively.

Let us end this paper with a solemn reminder regarding the violence, suppression and coercion associated with land acquisition. Many land owners have lost their lives and livelihood, while many are still engaged in battles against a powerful nexus of buyers and various parties with vested interests. At the same time, many land owners have successfully sold their lands and have a lifestyle that would not have been achievable by them otherwise. Given the complexity of the issue, and the humanitarian tragedies involved, we point out that our theoretical construct is a first cut aimed at understanding the trade-offs involved between economic and political considerations, and, consequently, we refrain from providing any facile policy recommendations.

7 Appendix

7.1 Proofs

Proof of Proposition 1: The buyer's objective in stage 2 is then to maximize $\Pi(k)$ by choosing k. The first order derivative of the buyer's profit function in (6) gives

$$\Pi'(k) = \frac{\lambda - v - r_I + 4k(r_I - r_P)}{2}, \tag{12}$$

where note that $\Pi'(0) = \frac{\lambda - v - r_I}{2} > 0$, and $\Pi'(1) = \frac{\lambda - v - r_I + 4(r_I - r_P)}{2}$. The FOC in case of an interior equilibrium is given by

$$k^*(r_P) = \frac{(\lambda - r_I - v)}{4(r_P - r_I)}.$$

Further, the second order derivative of the profit function gives

$$\Pi''(k) = 2(r_I - r_P),$$

so that $\Pi''(k) < 0$ if and only if $r_I < r_P$. Let $\tilde{k}(r_P)$ denote the choice of k that maximizes $\Pi(k)$. For $r_P < r_I$, $\Pi(k)$ is increasing and convex. Thus $\tilde{k}(r_P) = 1$. Whereas for $r_P > r_I$, $\Pi(k)$ is concave. Thus $\tilde{k}(r_P) = \min\{k^*(r_P), 1\}$. □

Proof of Proposition 2 Fix some $c \geq 0$ chosen by A. The lottery contest success function $\pi(k) = k$ means that the party F's problem is

$$\max_{r_P} Z(r_P) \equiv \gamma \tilde{k}(r_P) + (1 - \gamma)\tilde{k}(r_P)^2(r_p - c). \tag{13}$$

Thus, $Z(r_P) = \gamma + (1 - \gamma)(r_P - c)$ in case r_P induces no holdout (i.e. $\tilde{k}(r_P) = 1$), and $Z(r_P) = \frac{\lambda - v - r_I}{16}[\frac{4\gamma}{(r_P - r_I)} + \frac{(1-\gamma)(\lambda - r_I - v)(r_P - c)}{(r_P - r_I)^2}]$ otherwise. Thus, for any r_P that induces hold out, we have that

$$\frac{dZ}{dr_P} = \frac{(\lambda - r - v_I)}{16(r_P - r_I)^3}[(1 - \gamma)(\lambda - r_I - v)(2c - r_I - r_P) - \gamma(r_P - r_I)]. \tag{14}$$

For ease of exposition we define $Y \equiv [(1-\gamma)(\lambda - r_I - v)(2c - r_I - r_P) - \gamma(r_P - r_I)]$.

Let $\hat{r}_P$ solves $Y(r_P) = 0$, so that

$$\hat{r}_P = \frac{(1-\gamma)(2c - r_I)(\lambda - v - r_I) + \gamma r_I}{(1-\gamma)(\lambda - v - r_I) + \gamma}$$

. Let

$$\bar{c} := Y|_{r_P = r_I + \frac{\lambda - v - r_I}{4}, k=1} = \left(\frac{7}{8}\right) r_I + \frac{1}{8}\left(\frac{\gamma}{1-\gamma} + (\lambda - v)\right). \tag{15}$$

Note that $r_I < \bar{c}$. Also note that for any $r_P \leq r_I + \frac{\lambda - v - r_I}{4}$, from Proposition 1, the equilibrium does not involve any holdout and party F's utility is $\gamma + (1-\gamma)(r_P - c)$, so that it is increasing in r_P. Thus it is sufficient to consider $r_P \geq r_I + \frac{\lambda - v - r_I}{4}$.

To prove the first part of the proposition, suppose c is small, i.e. $c \leq r_I$. Consider r_P such that $r_P \geq r_I + (\lambda - v - r_I)/4$. We argue that $Z(r_P)$ is decreasing for all $r_P > r_I$ whenever the outcome involves holdout. Given that Y is decreasing in r_P, it is sufficient to establish this for r_P close to but greater than r_I. Since

$$Y|_{r_P = r_I} = 2(1-\gamma)(\lambda - r_I - v)(c - r_I) \leq 0,$$

it follows that $Z(r_P)$ is decreasing for all r_P greater than, but sufficiently close to r_I. Thus optimally party F sets $r_P^* = r_I + \frac{\lambda - r_I - v}{4}$. From Proposition 1 it then follows that $k^* = 1$ and there is no holdout. So suppose c is large, i.e. $c > r_I$ and $4(1-\gamma)\left(2(c - r_I) - \frac{\lambda - v - r_I}{4}\right) - \gamma \leq 0$ that implies $c \leq \bar{c}$. Note that

$$Y|_{r_P = r_I + \frac{\lambda - v - r_I}{4}} = \frac{\lambda - v - r_I}{4}\left(4(1-\gamma)(2(c - r_I) - \frac{\lambda - v - r_I}{4}) - \gamma\right) \leq 0.$$

Consequently, in this case $Z(r_P)$ is also *decreasing* in r_P for all $r_P \geq r_I + \frac{\lambda - v - r_I}{4}$. Thus the outcome involves $r_P^* = r_I + \frac{\lambda - v - r_I}{4}$, and for same reasons there is no holdout.

To prove the second part of the proposition, consider the case where $c > r_I$ and $4(1-\gamma)\left(2(c - r_I) - \frac{\lambda - v - r_I}{4}\right) - \gamma > 0$. This implies $c > \bar{c}$ by the fact that $r_I < \bar{c}$. Recall that

$$Y|_{r_P = r_I + \frac{\lambda - v - r_I}{4}} = \frac{\lambda - v - r_I}{4}\left(4(1-\gamma)(2(c - r_I) - \frac{\lambda - v - r_I}{4}) - \gamma\right).$$

Consequently, in this case $Z(r_P)$ is *increasing* in r_P for $r_P = r_I + \frac{\lambda - v - r_I}{4}$. Thus $r_P^* > r_I + \frac{\lambda - v - r_I}{4}$. In particular, $r_P^* = \hat{r}_P$. We note here that the profit of the buyer remains positive for all values of $r_P^* = \hat{r}_P$. To see this consider the buyer's profit function when $r_P^* = \hat{r}_P$ given by

$$\Pi(k^*(r_P^*)) = \frac{\lambda - r_I - v}{8(r_P - r_I)}\left(\frac{\lambda - r_I - v}{4(r_P - r_I)}(r_I - r_P) + (\lambda - r_I - v)\right).$$

Note that $\frac{\lambda - r_I - v}{8(r_P - r_I)}$ is positive for any $r_P > r_I$ and $\left(\frac{\lambda - r_I - v}{4(r_P - r_I)}(r_I - r_P) + (\lambda - r_I - v)\right) > 0$ as well since $\lambda > r_I + v$. Finally, note that as $r_P^* > r_I + \frac{\lambda - v - r_I}{4}$, from Proposition 1, $k^* < 1$ so that the outcome involves holdout. □

Proof of Proposition 3:

Let

$$L := \left(\frac{\delta}{2\alpha(1-\delta)}\right)\left((\lambda - r_I - v) + \frac{v}{1-\gamma}\right),$$

$$X := \left((\lambda - r_I - v) + \frac{\gamma}{1-\gamma}\right)^2,$$

From Proposition 2 we know that in the region $c \leq r_I$ there is no holdout. Since $\alpha > 0$ it must be that $c^*|_{c \leq r_I} = 0$ in that region. Similarly in the region $r_I < c \leq \bar{c}$ we have $c^*|_{r_I < c \leq \bar{c}} = 0$. This is because from Proposition 1 we know that for any $c \leq \bar{c}$ we have no hold out in which case A will save this cost. In both the above cases A's payoff equals 0.

Now consider the case when $c > \bar{c}$. Here $r_P^* = \hat{r}_P$ and the consequent $k^*(r_P)$ is

$$k^*|_{\bar{c} < c < G} = \frac{(1-\gamma)(\lambda - r_I - v) + \gamma}{8(1-\gamma)(c - r_I)}.$$

Hence in this region, A's payoff in c is

$$D = \delta\left(1 - \frac{(1-\gamma)(\lambda - r_I - v) + \gamma}{8(1-\gamma)(c - r_I)}\right) - (1-\delta)\alpha c.$$

Now

$$\frac{dD}{dc} = \frac{\delta((1-\gamma)(\lambda - r_I - v) + v)}{8(1-\gamma)(c - r_I)^2} - (1-\delta)\alpha,$$

and

$$\frac{d^2D}{dc^2} = \frac{\delta((1-\gamma)(\lambda - r_I - v) + v)}{4(\gamma - 1)(c - r_I)^3} < 0$$

since $c > r_I$ in the case under study. Consider first the free solution from the FOC: $\frac{dD}{dc} = 0$. This yields two roots, namely

$$c = r_I \pm \sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}.$$

Since we are in the zone $c > r_I$, it follows that the free solution must be

$$c_f = r_I + \sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}. \tag{16}$$

Next note $c_f > \bar{c}$ if and only if

$$\left(\frac{\gamma}{1-\gamma} + (\lambda - v - r_I)\right)^2 < \frac{\delta(1-\gamma)(\lambda - r_I - v) + v}{\alpha(1-\gamma)(1-\delta)},$$

that yields

$$\left(\frac{\gamma}{1-\gamma} + (\lambda - v - r_I)\right)^2 < \left(\frac{\delta}{\alpha(1-\delta)}\right)\left((\lambda - r_I - v) + \frac{v}{1-\gamma}\right). \tag{17}$$

Following the notations, Eq. (17) is equivalent to having $X < 2L$. Thus $c^* = c_f = r_I + \sqrt{\frac{\delta(1-\gamma)(\lambda - r_I - v)}{8\alpha(1-\gamma)(1-\delta)}}$ if and only if $X < 2L$ (that is equivalent to $\alpha < \bar{\alpha}$), provided the payoff to A is positive as otherwise it will never set a positive c. Now, A's payoff from c_f is positive if and only if

$$\delta\left(1 - \frac{\lambda - r_I - v}{4(r_P - r_I)} + \alpha r_I\right) > \alpha r_I + \sqrt{\frac{\alpha(1-\delta)\delta(\lambda - r_I - v)}{8}}. \tag{18}$$

It is straightforward to verify that there exists a $0 < \tilde{\delta} < 1$ such that the above inequality holds if and only if $\delta > \tilde{\delta}$. Thus for all such values of δ we have $c^* = c_f$ while for all $\delta < \tilde{\delta}$ we have $c^* = 0$.

Given Eq. (17) if $c_f \leq \bar{c}$ then it must be true that

$$\left(\frac{\gamma}{1-\gamma} + (\lambda - v - r_I)\right)^2 \geq \left(\frac{\delta}{\alpha(1-\delta)}\right)\left((\lambda - r_I - v) + \frac{v}{1-\gamma}\right).$$

But this gives $X \geq 2L$ that is equivalent to $\alpha \geq \bar{\alpha}$. Then the constrained optimum $c^* = 0$ as there will be no eventuality with holdout.

To prove the comparative static results, recall that

$$c_f = r_I + \frac{\delta(\lambda - v - r_I)}{8\alpha(1-\delta)}$$

Clearly $\frac{\partial c_f}{\partial \alpha} < 0$; $\frac{\partial c_f}{\partial v} < 0$; $\frac{\partial c_f}{\partial \lambda} > 0$ and $\frac{\partial c_f}{\partial \delta} > 0$.

$$\frac{\partial c_f}{\partial r_I} = \frac{\sqrt{\frac{2\delta(\lambda - v - r_I)}{\alpha(1-\delta)}}}{8(r_I + v - \lambda)} + 1$$

Note that for given $\lambda - v - r_I > 0$ we have $\frac{\partial c_f}{\partial r_I} < 0$ if and only if $32(\lambda - r_I - v) > \frac{\delta}{\alpha(1-\delta)}$. □

Proof of Corollary 1 Recall that

$$r_P^* = \hat{r}_P = \frac{(1-\gamma)\left(r_I + 2\sqrt{\frac{\delta(\lambda - r_I - v)}{8\alpha(1-\delta)}}\right)(\lambda - v - r_I) + \gamma r_I}{(1-\gamma)(\lambda - v - r_I) + \gamma}$$

Clearly $\frac{\partial \hat{r}_P}{\partial \alpha} < 0$.
It is straightforward to verify that

$$\frac{\partial \hat{r}_P}{\partial \lambda} = \frac{\sqrt{2}(1-\gamma)((1-\gamma)(\lambda - v - r_I)) + 3\gamma)\sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}}}{4((1-\gamma)(\lambda - r_I - v) + \gamma)^2}$$

Note that $\frac{\partial \hat{r}_P}{\partial \lambda} > 0$ for any $0 < \gamma < 1$.

$$\frac{\partial \hat{r}_P}{\partial v} = \frac{\sqrt{2}(\gamma - 1)((1-\gamma)(\lambda - v - r_I)) + 3\gamma)\sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}}}{4((1-\gamma)(\lambda - r_I - v) + \gamma)^2}$$

Note that $\frac{\partial \hat{r}_P}{\partial v} < 0$ for any $0 < \gamma < 1$.
Finally, we have

$$\frac{\partial \hat{r}_P}{\partial r_I} = \frac{\sqrt{2}\left((\gamma - 1)((1-\gamma)(\lambda - v - r_I)) + 3\gamma)\sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}} + 2\sqrt{2}((1-\gamma)(\lambda - v - r_I) + \gamma)^2\right)}{4((1-\gamma)(\lambda - r_I - v) + \gamma)^2}.$$

Then, $\frac{\partial \hat{r}_P}{\partial r_I} > 0$ if and only if

$$2\sqrt{2}((1-\gamma)(\lambda - v - r_I) + \gamma)^2) - (1-\gamma)((1-\gamma)(\lambda - v - r_I)) + 3\gamma)\sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}} > 0.$$

Define $A := (1-\gamma)(\lambda - v - r_I) + \gamma)$ and $B := \sqrt{\frac{\delta(\lambda - v - r_I)}{\alpha(1-\delta)}}$. Then the above expression can be written as

$$\hat{r}_P r_I(A, B) := 2\sqrt{2}A^2 - B(1-\gamma)A - 2B(1-\gamma)\gamma > 0.$$

One can check that the function $\hat{r}_P r_I(A, B)$ is concave with two roots of A. We denote them as a_i for $i = 1, 2$ where a_i is as follows:

$$a_i = \frac{B(1-\gamma) \pm \sqrt{B^2(1-\gamma)^2 + 4.4\sqrt{2}B(1-\gamma)\gamma}}{4\sqrt{2}}$$

Since we have $\lambda - v - r_I > 0$ and $0 < \gamma < 1$ by assumption, we always have $A > 0$. Thus $\frac{\partial \hat{r}_P}{\partial r_I} > 0$ whenever $A > a_i$ and $\frac{\partial \hat{r}_P}{\partial r_I} < 0$ whenever $A < a_i$. It is now routine to check whether both the roots are positive. For given $0 < \gamma < 1$ there is only one root of A that is positive and it is given by $a_2 = \frac{B(1-\gamma) + \sqrt{B^2(1-\gamma)^2 + 16\sqrt{2}B(1-\gamma)\gamma}}{4\sqrt{2}}$. Hence we have $\frac{\partial \hat{r}_P}{\partial r_I} > 0$ whenever $\lambda - v - r_I$ is significantly bigger than $\frac{\gamma}{1-\gamma}$ and $\frac{\partial \hat{r}_P}{\partial r_I} < 0$ whenever $\lambda - v - r_I$ is significantly smaller than $\frac{\gamma}{1-\gamma}$. □

Details on Coercion:

Proposition **4** *Suppose the pro-industrial party F is coercive and coercion, if exercised, imposes a direct cost of amount $\chi > 0$ on any seller who refuses to sell land in the early phase through the party. Then the following is true in equilibrium:*

(i) If λ and χ are sufficiently small, then the possibility of coercion reduces holdout. However, for sufficiently large λ, coercion increases holdout. For intermediate values of λ, holdout increases only if χ is sufficiently large;

(ii) Political rent-seeking (r_P) and degree of opposition (c) are both higher in the presence of coercion; however no seller pays the coercion penalty χ;

(iii) (a) Land price in the late phase (as determined by direct bargaining between the buyer and the sellers, i.e. q_b) is not affected;

(b) *Land price in the early phase (as settled through party F, i.e. q) necessarily falls when bureaucratic corruption is high (high r_I) and may even fall below v;*

(c) *An increase in bureaucratic corruption, i.e. an increase in r_I, reduces q for r_I small. However, this happens at a decreasing rate, and q may even increase if the existing level of corruption is already very high and party F is highly motivated.*

To prove this, note that given (q, k), if there is no refusal then the second period price remains $q_b = \frac{\lambda+v}{2} + r_I\left(\frac{1}{2} - \beta\right)$ as before. So consider a unilateral deviation by a seller who now refuses when approached while a fraction k accepts. Then his payoff from this deviation is

$$\pi(k)[q_b - (1-\beta)r_I] + (1 - \pi(k))v - \chi$$

while by not deviating he obtains $\pi(k)q + (1 - \pi(k))v$. Thus for a fixed target of period 1 sales k, a profit maximising price offer from the buyer must equalise these two expressions, yielding period 1 price equal to

$$q_{\text{coercion}} = q_b - (1-\beta)r_I - \frac{\chi}{k}. \tag{19}$$

Contrast (19) with (4). There is a fundamental distinction where although in equilibrium there is no refusal and therefore no seller incurs the cost χ directly, the threat of coercion affects the buyer's first period price offer, allowing him room to reduce it by an amount $\frac{\chi}{k}$. Replacing the expression for q_{coercion} in the buyer's profit function (see (6)), it is easy to verify that the impact of a positive χ is equivalent to an increase in λ by an amount 2χ. Hence, it follows from Proposition 1 that there is holdout if and only if $r_P > r_I + \frac{(\lambda+2\chi)-v-r_I}{4}$ with first period sales given by

$$k_{\text{coercion}}(r_P) = \frac{(\lambda + 2\chi) - r_I - v}{4(r_P - r_I)}.$$

Hence ceteris paribus, the size of holdout falls under coercion. Of course the possibility of coercion may now affect the equilibrium value of the political variable r_P directly as well as indirectly via a change in the equilibrium value of the other political variable c.

Given that χ is never exercised in equilibrium, irrespective of the source of this threat or the cost of administering it, the rest of the analysis turns out to be equivalent to what we have undertaken in Sections 4.1 and 4.2. Since the equilibrium response of r_P is positive with λ in our baseline model, introduction of coercion increases r_P (see Corollary 1). The same conclusion can be drawn about c^* (see Proposition 3 part 2(a)). *Thus with the possibility of a coercive F party, it is clear that both political rent-seeking and political opposition rises*.

What about holdout once political variables are chosen in equilibrium? We have seen that in the benchmark analysis, the impact of a rise in λ on k^* is non-monotonic: its positively related if $\lambda < v + r_I - \frac{\gamma}{1-\gamma}$ and otherwise negatively related. *Hence we can conclude that if λ and χ are sufficiently small, then the possibility of coercion increases k^* thereby reducing holdout. However, for sufficiently large λ, coercion decreases k^* thereby increasing holdout. For intermediate values of λ, holdout increases only if χ is sufficiently large*.

In general one obtains a qualitatively identical result as reported in Theorem 1 except that now the expression for period 1 equilibrium price is different. In particular, if political weakness is high (meaning α small) and the motivation parameter δ of A is large so that there is holdout, it follows that the equilibrium period 1 price equals

$$q_{\text{coercion}} = \frac{\lambda + v}{2} - \frac{r_I}{2} - \frac{\chi}{k_{\text{coercion}}}, \tag{20}$$

where

$$k_{\text{coercion}} = \frac{\sqrt{2}((1-\gamma)(\lambda + 2\chi - r_I - v) + \gamma)}{4(1-\gamma)\sqrt{\frac{\delta(\lambda+2\chi-r_I-v)}{\alpha(1-\delta)}}}.$$

Thus we show that with coercion, first period price is unambiguously lower (viz. $q_{\text{coercion}} < q$). We have seen above that without the possibility of coercion, an increase in legal weakness (i.e., a rise in r_I) reduces period 1 price of land linearly (at a rate equal to $-1/2$). We now show that linearity of this relationship is unambiguously destroyed and worsening of legal weakness arrests this fall. More interestingly this convexity of period 1 price in the degree of legal weakness gives rise to generic instances where increase in this weakness can even increase q_{coercion}. To see this, note that provided there is holdout,

$$\frac{\partial q_{\text{coercion}}}{\partial r_I} = -1/2 + \frac{\chi}{k^2_{\text{coercion}}}\frac{\partial k_{\text{coercion}}}{\partial r_I}.$$

Next check that

$$\frac{\partial k_{\text{coercion}}}{\partial r_I} = \frac{\sqrt{2}\alpha(1-\delta)((1-\gamma)(\lambda+2\chi-r_I-v)-\gamma)\sqrt{\frac{\delta(\lambda+2\chi-r_I-v)}{\alpha(1-\delta)}}}{8\delta(r_I+v-\lambda-2\chi)^2(\gamma-1)},$$

using which it can be verified that $\frac{\partial k_{\text{coercion}}}{\partial r_I} < 0$ if $r_I < \lambda + 2\chi - v - \frac{\gamma}{1-\gamma}$ and $\frac{\partial k_{\text{coercion}}}{\partial r_I} > 0$ if $r_I > \lambda + 2\chi - v - \frac{\gamma}{1-\gamma}$. Hence k_{coercion} is convex in r_I. From (20) it then follows that q_{coercion} is convex in r_I as well so that *as the legal institution deteriorates further, the period 1 price under the threat of coercion falls at a decreasing rate*.

To show that q_{coercion} can be upward sloping for high values of r_I, we know that $\frac{\partial q_{\text{coercion}}}{\partial r_I} = 0$ if and only if $\frac{\partial k_{\text{coercion}}}{\partial r_I} = \frac{k^2_{\text{coercion}}}{2\chi}$. Now, note that with $r_I = \lambda - v$, its maximum value, we have

$$\lim_{\gamma \to 1} \frac{\partial k_{\text{coercion}}}{\partial r_I} = \frac{\sqrt{2}\alpha(1-\delta)((1-\gamma)2\chi-\gamma)\sqrt{\frac{2\delta\chi}{\alpha(1-\delta)}}}{8\delta(-2\chi)^2(\gamma-1)} = +\infty.$$

Since the maximum value of period 1 sales is 1, it follows that for γ high enough, $\frac{\partial k_{\text{coercion}}}{\partial r_I} > \frac{k^2_{\text{coercion}}}{2\chi}$. Hence for r_I and γ high enough, we have $\frac{\partial q_{\text{coercion}}}{\partial r_I} > 0$. □

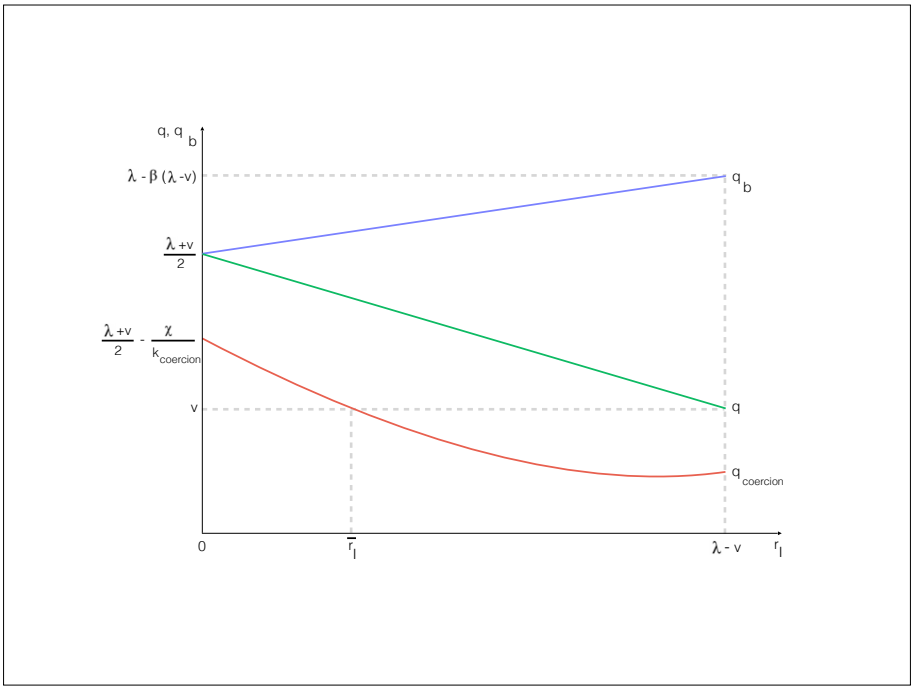

Figure 5: Effects of a change in r_I on the price of land (q_{coercion} and q_b) when party F is coercive and has a high γ.

Fig. 5 depicts and compares the period 1 prices with and without coercion. As indicated in the figure, if party F is highly motivated, so that γ is large, then, for very high values of r_I, the period 1 price can rise as corruption increases, i.e. r_I increases. Also note that with the possibility of coercion, the price of land can be even less than v whenever the size of corruption is large (larger than $\bar{r}_I$ in the figure) and γ is high.

We next address the issue of the impact of a coercive party F on seller utility (in relation to the discussion in Section 5.2.1). In presence of coercion the welfare of the sellers is

$$U_S(\text{coercion}) = \frac{\sqrt{2}((1-\gamma)(\lambda+2\chi-v-r_I)+\gamma)}{4(1-\gamma)\sqrt{\frac{\delta(\lambda+2\chi-v-r_I)}{\alpha(1-\delta)}}}\left(\frac{\lambda-2\chi-v-r_I}{2}\right)+v.$$

Hence, U_S(coercion) $\geq U_S$ iff

$$\frac{(1-\gamma)(\lambda+2\chi-v-r_I)+\gamma)}{\sqrt{\delta(\lambda+2\chi-v-r_I)}}(\lambda-2\chi-v-r_I) \geq \frac{(1-\gamma)(\lambda-v-r_I)+\gamma)}{\sqrt{\delta(\lambda-v-r_I)}}(\lambda-v-r_I).$$

Given that the LHS of the preceding expression equals the RHS at $\chi = 0$, and that the LHS is decreasing in χ while the RHS is independent of χ, the above is never true whenever $\chi > 0$, that is, there is coercion. Thus we get $U_S > U_S$(coercion). This means that the seller's benefit from a lower size of holdout is more than compensated by the drop in period 1 price. Thus no amount of coercion is liked by the sellers.

Proof of Theorem 2 and Corollary 2:

$k^* = \frac{(1-\gamma)(\lambda-r_I-v)+\gamma}{8(1-\gamma)(c_f-r_I)}$ if there is holdout where $c_f = r_I + \sqrt{\frac{\delta(\lambda-r_I-v)}{8\alpha(1-\delta)}}$. Substituting c_f yields

$$k^* = \frac{\sqrt{2}((1-\gamma)(\lambda-r_I-v)+\gamma)}{4(1-\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}.$$

Now the comparative statics are as follows:

$$\frac{\partial k^*}{\partial \alpha} = \frac{\sqrt{2}(1-\delta)((1-\gamma)(\lambda-r_I-v)+\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}{8\delta(r_I+v-\lambda)(\gamma-1)}.$$

Note that $\frac{\partial k^*}{\partial \alpha} > 0$ for given $0 < \gamma < 1$ and the assumption of $\lambda > r_I + v$.

$$\frac{\partial k^*}{\partial \gamma} = \frac{\sqrt{2}}{4(\gamma-1)^2\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}} > 0.$$

$$\frac{\partial k^*}{\partial \delta} = \frac{\sqrt{2}\alpha((1-\gamma)(\lambda-r_I-v)+\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}{8\delta^2(1-\gamma)(r_I+v-\lambda)}.$$

Note that $\frac{\partial k^*}{\partial \delta} < 0$ for given the assumption of $\lambda > r_I + v$.

$$\frac{\partial k^*}{\partial \lambda} = \frac{\sqrt{2}\alpha(\delta-1)((1-\gamma)(\lambda-r_I-v)-\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}{8\delta(r_I+v-\lambda)^2(\gamma-1)}.$$

Note that given $0 < \gamma < 1$ and $0 < \delta < 1$, $\frac{\partial k^*}{\partial \lambda} > 0$ if and only if $(\lambda - v) - r_I > \frac{\gamma}{1-\gamma}$.

$$\frac{\partial k^*}{\partial v} = \frac{\partial k^*}{\partial r_I} = \frac{\sqrt{2}\alpha(1-\delta)((1-\gamma)(\lambda-r_I-v)-\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}{8\delta(r_I+v-\lambda)^2(\gamma-1)}.$$

Note that given $0 < \gamma < 1$, $0 < \delta < 1$ both $\frac{\partial k^*}{\partial v} < 0$ and $\frac{\partial k^*}{\partial r} < 0$ if and only if $(\lambda - v) - r_I > \frac{\gamma}{1-\gamma}$. Finally, the cross partial derivative of k^* with respect to the parameters α and r_I gives us the following,

$$\frac{\partial^2 k^*}{\partial \alpha \partial r_I} = \frac{\sqrt{2}(1-\delta)((1-\gamma)(\lambda-r_I-v)-\gamma)\sqrt{\frac{\delta(\lambda-r_I-v)}{\alpha(1-\delta)}}}{16\delta(r_I+v-\lambda)^2(\gamma-1)}.$$

For given $0 < \gamma < 1$, $0 < \delta < 1$ and the assumption $\lambda > v + r_I$, we have $\frac{\partial^2 k^*}{\partial \alpha \partial r_I} > 0$ if and only if $(1-\gamma)(\lambda - r_I - v) - \gamma < 0$ that gives $\lambda - r_I - v < \frac{\gamma}{(1-\gamma)}$. □

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8 Online Appendix

8.1 Holdout with general $\pi(k)$, $V(k)$ and $C(k)$ functions

In the paper we have found robust sufficient conditions for which $k^* < 1$ (what we called the incidence of holdout). We now show that this result is not hostage to the simplified linear functions for $\pi(\cdot)$ and $V(\cdot)$ or quadratic cost function $C(\cdot)$. We retain all the basic features of the original model to characterise the problem of holdout except that now the $\pi(\cdot)$, $V(\cdot)$ and $C(\cdot)$ functions are more general. In particular, we assume that $C(k) = ck^m, m > 1, c \geq 0$ while $V(\cdot)$ and $\pi(\cdot)$ are at least twice differentiable and strictly concave with the following properties: $\pi(0) = 0$, $\pi(1) = 1$, $\pi'(1) \geq 0$, and $\frac{\pi(k)}{k\pi'(k)} = \epsilon$, (i.e., $\pi(\cdot)$ exhibits constant elasticity, an example being $\pi(k) = k^\alpha$, $0 < \alpha \leq 1$); and $V(0) = 0$, $V(1) \geq V'(1)$.

In this general framework, one issue is that of ensuring participation by party F in equilibrium. Given (2), it can be easily verified that with zero reservation payoff for A, it will never set a c larger than $\frac{\delta}{\alpha(1-\delta)}$. Hence, given the cost function $C(k) = ck^m$, it follows that F's participation is guaranteed if its reservation payoff is $-\frac{\delta(1-\gamma)}{(1-\delta)\alpha}$, or lower. This is of course a departure from our earlier framework where the reservation payoff of party F was zero. One can however think of scenarios where, for F, not to not help industrial buyers at all, particularly in a developing country aspiring for economic growth, can be politically very costly. On the other hand not agreeing to oppose industrial projects (which is equivalent to setting $c = 0$) may not be that costly for A. Hence in such scenarios it may be natural to have an asymmetry in the reservation utilities of the two parties. We will assume that A's reservation payoff is zero while that of F is not above $-\frac{(1-\gamma)\delta}{(1-\delta)\alpha}$ which ensures F's participation. In any event, a binding reservation payoff of F will only reduce the cutoff value of c below which there is no holdout. Keeping that in mind we proceed by assuming full participation of F.

Let

$$\psi(k) = \frac{V(1) - V(k)}{1 - k}.$$

Thus $\psi(0) = V(1)$ and $\psi(1) = V'(1)$. Note that given the concavity of $V(\cdot)$ function $\psi'(k) = \frac{\frac{V(1)-V(k)}{1-k} - V'(k)}{1-k} < 0$ and $\psi''(k) = \frac{-V''(k)(1-k)}{(1-k)^4} \geq 0$. Moreover $\psi'(0) = V(1)$ and $\psi'(1) = \frac{V''(1)}{2}$.

A buyer's direct bargaining with $1 - k$ fraction of sellers in the second phase yields

$$q_b = \frac{\psi(k)}{2} + \frac{v}{2} + r_I\left(\frac{1}{2} - \beta\right).$$

We now determine the fraction of sellers k joining party F in stage 3 where the indifferent seller k is again given by $q(k) = q_b - (1 - \beta)r_I$. Hence the profit function of the buyer in stage 2 is

$$\Pi(k) = \pi(k)[V(1) - k(q + r_P) - (1 - k)(q_b + \beta r_I)].$$

Substituting q, q_b in the above expression we obtain

$$\Pi(k) = \pi(k)\left(V(1) - \frac{\psi(k)}{2} - \frac{v}{2} - \frac{r_I}{2} - k(r_P - r_I)\right), \tag{21}$$

so that $\Pi(0) = 0$ and $\Pi(1) = \frac{2V(1)-V'(1)-2r_P+r_I-v}{2}$.

The buyer's objective in stage 2 is then to maximise $\Pi(k)$ by choosing k. Denote the optimal choice by $\tilde{k}(r_P)$. The first derivative of his profit function in (21) gives

$$\Pi'(k) = \frac{1}{2}(\pi'(k)(2V(1) - 2k(r_P - r_I) - \psi(k) - v - r_I) + \pi(k)(2(r_I - r_P) - \psi'(k))).$$

Let $\bar{\epsilon} = \frac{\pi'(k)/k}{\pi''(k)}$. Note that given the concavity of $\pi(\cdot)$ we have $\bar{\epsilon} \leq 0$. Moreover $\bar{\epsilon} = \frac{\epsilon}{1-\epsilon}$. Substituting ϵ in the first derivative of the buyer's profit gives

$$2\Pi'(k) = \pi'(k)(2V(1) - 2k(r_P - r_I)(1 + \epsilon) - \psi(k) - v - r_I - \epsilon k\psi'(k)). \tag{22}$$

To obtain an interior solution for k and thereby getting holdout we need to show that $\Pi(k)$ has the following properties: $\Pi'(0) > 0$, $\Pi'(1) < 0$ and $\Pi''(\cdot) < 0$. Using the properties of $\psi(\cdot)$ equation (22) yields

$$2\Pi'(0) = \pi'(0)(V(1) - v - r_I) > 0,$$

and

$$2\Pi'(1) = \pi'(1)(2V(1) - 2(r_P - r_I)(1+\epsilon) - V'(1) - v - r_I - \epsilon\frac{V''(1)}{2}).$$

The necessary FOC for an interior equilibrium is as follows and this implicitly gives the value $k^*(r_P)$.

$$2V(1) - 2k^*(r_P - r_I)(1+\epsilon) - \psi(k^*) - v - r_I - \epsilon k^*\psi'(k^*) = 0. \tag{23}$$

Further the second order derivative of the profit function gives

$$2\Pi''(k) = \pi''(k)(2V(1) - 2k(r_P - r_I) - \psi(k) - v - r_I) + 2\pi'(k)(-2(r_P - r_I) - \psi'(k)) - \pi(k)\psi''(k).$$

Substituting ϵ and $\bar{\epsilon}$ in the above expression yields

$$2\Pi''(k) = \pi''(k)(2V(1) - \psi(k) - v - r_I - 2k(r_P - r_I)(1+\epsilon)(1+\bar{\epsilon}) - k\psi'(k)(\epsilon + \bar{\epsilon}(1+\epsilon)) - \epsilon\bar{\epsilon}k^2\psi''(k)). \tag{24}$$

Notice that given the concavity of $\pi(\cdot)$, $\Pi''(k) < 0$ if and only if $2V(1) - \psi(k) - v - r_I - 2k(r_P - r_I)(1+\epsilon)(1+\bar{\epsilon}) - k\psi'(k)(\epsilon + \bar{\epsilon}(1+\epsilon)) - \epsilon\bar{\epsilon}k^2\psi''(k) > 0$. Note that $2V(1) - \psi(k) - v - r_I > 0$ since $\psi'(k) < 0$ and given $\psi''(\cdot) \geq 0$, $\epsilon > 0$ and $\bar{\epsilon} \leq 0$ we have $\epsilon\bar{\epsilon}k^2\psi''(k) \leq 0$. Observe that $2k(r_P - r_I)(1+\epsilon)(1+\bar{\epsilon}) < 0$ whenever $r_P > r_I$ holds.

Consider the following set of conditions denoted by *Condition* $\mathcal{P}$:

- $\epsilon + \bar{\epsilon}(1+\epsilon) < 0$, and
- $2V(1) - V'(1) - v - r_I > 2(r_P - r_I)(1+\epsilon)(1+\bar{\epsilon}) + \frac{V''(1)k(\epsilon+\bar{\epsilon}(1+\epsilon))}{2} + \epsilon\bar{\epsilon}k^2\psi''(1)$.

This yields the following observation:

Observation **2** *Suppose Condition $\mathcal{P}$ holds. Then there is holdout if and only if the size of political rents is significantly higher than the size of legal rents, that is* $r_P > r_I + \frac{2V(1) - V'(1) - v - r_I - \epsilon\frac{V''(1)}{2}}{2(1+\epsilon)}$.

To see this suppose $r_P < r_I$ such that Condition $\mathcal{P}$ is violated. Then $\Pi(k)$ is increasing and convex. Thus $\tilde{k}(r_P) = 1$. Otherwise if Condition $\mathcal{P}$ holds then $\Pi(k)$ is concave. Hence $\tilde{k}(r_P) = \min\{k^*(r_P), 1\}$. □

Given the above analysis we now move to the activity of party F. For a given $c \geq 0$ by A, the objective of party F is to

$$\max_{r_P \geq 0} Z(r_P) \equiv \gamma\pi(\tilde{k}(r_P)) + (1-\gamma)[\pi(\tilde{k}(r_P))\tilde{k}(r_P)r_p - c\tilde{k}^m(r_P)] \tag{25}$$

where $m > 1$ so that the cost is convex. In the main text we have used $m = 2$.

Thus in case when r_P induces no holdout so that $\tilde{k}(r_P) = 1$, then $Z(r_P) = \gamma + (1-\gamma)(r_p - c)$ and $Z(r_P)$ is increasing in r_P. In case when r_P induces holdout so that $\tilde{k}(r_P) = k^*(r_P)$, then

$$Z(r_P) = \gamma\pi(k^*(r_P)) + (1-\gamma)[k^*(r_P)(\pi(k^*(r_P))r_p - ck^{*(m-1)}(r_P))].$$

Note that for any $0 < \gamma < 1$ we have $Z(r_P) > 0$ if $r_P \geq \frac{ck^{*(m-1)}(r_P)}{\pi(k^*(r_P))}$.

Thus for any r_P that induces holdout, we have

$$\frac{\partial Z(r_P)}{\partial r_P} = \frac{\partial k^*(r_P)}{\partial r_P}(\pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon r_P)) - (1-\gamma)mck^{*(m-1)}(r_P)).$$

Recall that the interior equilibrium $k^*(r_P)$ is implicitly obtained from the necessary FOC of the buyer's profit function given in equation (23). Hence we take total derivative of this FOC to obtain

$$\frac{\partial k^*(r_P)}{\partial r_P} = \frac{2k^*(r_P)(1+\epsilon)}{-2(r_P - r_I)(1+\epsilon) - \psi'(k^*(r_P))(1+\epsilon) - k^*(r_P)\psi''(k^*(r_P))\epsilon} < 0,$$

since $2k^*(r_P)(1+\epsilon) > 0$ and $-2(r_P - r_I)(1+\epsilon) - \psi'(k^*(r_P))(1+\epsilon) - k^*(r_P)\psi''(k^*(r_P))\epsilon < 0$ for any $r_P > r_I$. Thus $\frac{\partial Z(r_P)}{\partial r_P} < 0$ if and only if $\pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon r_P)) - (1-\gamma)mck^{*(m-1)}(r_P) > 0$. For ease of exposition we define $Y \equiv \pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon r_P)) - (1-\gamma)mck^{*(m-1)}(r_P)$.

If r_P induces holdout then we denote the optimal choice of F by $\hat{r}_P$ that solves $Y = 0$. This implicitly gives $\hat{r}_P$

$$\hat{r}_P = \frac{c(1-\gamma)mk^{*(m-1)}(\hat{r}_P) - \pi'(k^*(\hat{r}_P))(\gamma + (1-\gamma)k^*(\hat{r}_P))}{(1-\gamma)\pi(k^*(\hat{r}_P))}.$$

Let

$$R_I = r_I + \frac{2V(1) - V'(1) - v - r_I - \epsilon\frac{V''(1)}{2}}{2(1+\epsilon)},$$

and

$$\hat{c} = \left(R_I + \frac{1}{\epsilon} + \frac{\gamma}{(1-\gamma)\epsilon k^*(\hat{r}_P)}\right)\frac{\pi(k^*(\hat{r}_P))}{mk^{*(m-1)}}.$$

Note that given the characteristics of $V(\cdot)$ and ϵ we have $r_I < R_I < \hat{c}$.[38]

Observation **3** *There is a unique SPNE for each subgame initiated by A through a choice of c. Let r_P^* denotes the optimal choice of party F,*

1. *if $c \leq \hat{c}$ and $Y|_{r_P=R_I} > 0$ then $r_P^* = R_I$, and there is no holdout,*
2. *if $c > \hat{c}$ and $Y|_{r_P=R_I} < 0$ then $r_P^* = \hat{r}_P > R_I$ and there is holdout.*

From Observation 2 we know that for any $r_P \leq R_I$ there is no holdout on the equilibrium path. Thus party F's utility is $\gamma + (1-\gamma)(r_p - c)$ and it is increasing in r_P. We now argue whether $Z(r_P)$ is decreasing for any $r_P > R_I$. To see this we first consider a small c such that $\frac{ck^{*(m-1)}(r_P)}{\pi(k^*(r_P))} \leq R_I$. If party F chooses any $r_P > R_I$ then $Y|_{r_P=R_I} = \pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon r_P)) - (1-\gamma)mck^{*(m-1)}(r_P)$. Consequently $Z(r_P)$ is positive at $r_P = R_I$ but is decreasing in r_P. Hence optimally party F sets $r_P^* = R_I$ for this region and there is no holdout. We next consider c is large such that $\frac{ck^{*(m-1)}(r_P)}{\pi(k^*(r_P))} > R_I$. If $Z(r_P)$ is increasing in this region, then party F optimally chooses $r_P^* > R_I$ for this region. From Observation 2 for any $r_P > R_I$ there is holdout, and the optimal r_P is then implicitly obtained from the necessary FOC. Note that if $Y|_{r_P=R_I} = \pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon R_I)) - (1-\gamma)mck^{*(m-1)}(r_P) > 0$, so that $Z(r_P)$ is decreasing then optimally party F sets $r_P^* = R_I$ and there is no holdout. Otherwise if $Y|_{r_P=R_I} = \pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon R_I)) - (1-\gamma)mck^{*(m-1)}(r_P) < 0$, so that $Z(r_P)$ is increasing in r_P, then optimally party F sets $r_P^* = \hat{r}_P$ and the outcome involves holdout. Note that for sufficiently large c such that $c > \hat{c}$ we have $\hat{r}_P > R_I$. Hence if $c > \hat{c}$ and $Z(r_P)$ is increasing in r_P (obtained from $Y|_{r_P=R_I} = \pi'(k^*(r_P))(\gamma + (1-\gamma)k^*(r_P)(1+\epsilon R_I)) - (1-\gamma)mck^{*(m-1)}(r_P) < 0$), then optimally party F sets $r_P^* = \hat{r}_P$ and the outcome involves holdout. This verifies Observation 3. □

Finally we consider the initiation of this whole game and find conditions under which A's equilibrium choice of c yields a SPE with holdout. A's objective is to

$$\max_{c \geq 0} D \equiv \delta(1 - \pi(\tilde{k}(r_P))) - (1-\delta)\alpha c, \tag{26}$$

where $\tilde{k}(r_P)$ is the buyer's optimal choice of k.

Observation **4** *Suppose $D|_{c=\hat{c}} > 0$ and $Y|_{r_P=R_I} < 0$. Then a SPNE choice of opposition level by A is $c^* = \hat{c}$ and the outcome involves holdout.*

From Observation 3 we know that the region where $c \leq R_I$ there is no holdout. Since $\alpha > 0$ it must then be optimal for A to choose $c^*|_{c \leq R_I} = 0$. In this case A's payoff is 0. Now consider the region where $r_P > R_I$ that induces holdout. From observation 3 we know that for a large c such that $c > \hat{c}$ and $Y|_{r_P=R_I} < 0$ we have $r_P^* = \hat{r}_P$. Thus party $A's$ payoff in c is

$$D = \delta(1 - \pi(k^*(\hat{r}_P))) - (1-\delta)\alpha c,$$

and the necessary FOC: $\frac{\partial D}{\partial c} = 0$ implicitly gives the value of $\hat{c}(k^*(\hat{r}_P))$[39]. The party's payoff from choosing $\hat{c}(k^*(\hat{r}_P))$ is $D|_{c>\hat{c}} = \delta(1 - \pi(k^*(\hat{r}_P))) - (1-\delta)\alpha\hat{c}(k^*(\hat{r}_P))$. Note that if $D|_{c>\hat{c}} > 0$ then party A optimally chooses $c^* = \hat{c}$. This holds true for α sufficiently close to 0. Now $\hat{r}_P > R_I$ if and only if

$$\hat{c} = \left(R_I + \frac{1}{\epsilon} + \frac{\gamma}{(1-\gamma)\epsilon k^*(\hat{r}_P)}\right)\frac{\pi(k^*(\hat{r}_P))}{mk^{*(m-1)}}.$$

[38] Note that here R_I corresponds to $r_I + \frac{\lambda - v - r_I}{4}$ and $\hat{c}$ corresponds to $\bar{c}$ in the linear $\pi(\cdot)$ and $V(\cdot)$ case.

[39] This corresponds to c_f in the linear $\pi(\cdot)$ and $V(\cdot)$ case.

Since $\frac{\partial k^*(\hat{r}_P)}{\partial \hat{r}_P} < 0$ the above holds true for sufficiently large $\hat{r}_P$. Since we are at the region when $c > \hat{c}$, we have $\hat{r}_P > R_I$. Hence we have sufficient conditions for holdout. □

8.2 Involvement of party F in late stage of land acquisition

Consider a scenario in which once the project passes through the political battle, party F can get involved in the barging that takes place between the buyer and the remaining $1-k$ sellers if and only iff all parties agree. Of course in this case party F leverages its connections in local institutions to ensure that the additional transaction costs r_I are waived in this stage as well. In return, it asks for a per-unit rent of amount b that is to be shared between the buyer and the sellers in the proportion β and $1-\beta$ as was for the case of sharing r_I.

Suppose the game reaches Stage 5 and party F sets this rent b. Then Nash program is:

$$\max_{q_b \geq 0}[\lambda - (1-k)(q_b + \beta b) - \lambda k][(1-k)(q_b - v - (1-\beta)b)].$$

Also, it is easy to see that in equilibrium, party F will set $b = r_I$ just to make all bargaining parties indifferent between paying r_I, or paying party F to avoid paying r_I. Hence, the two prices of land will remain as in the benchmark model (Lemma 2). It then immediately follows that with exogenous politics in the early stage (that is, when r_P and c are fixed), Proposition 1 remains intact.

Now consider the optimal demand for the first period rent by party F. The possibility of future involvement and the equilibrium behaviour in that continuation game changes F's period 1 payoff from (1) to

$$\max_{r_P} Z(r_P) = \gamma\pi(k^*) + (1-\gamma)[\pi(k^*)(k^* r_P + (1-k^*)r_I) - c(k^*)^2],$$

where k^* is as in Proposition 1. It is again routine to show that for c large enough, this rent is given by

$$r'_P = \frac{(1-\gamma)(\lambda + 3r_I - v)r_I + 2c(1-\gamma)(\lambda - v - r_I) - 4\gamma r_I}{(1-\gamma)(\lambda + 3r_I - v) + 4\gamma}.$$

Since the payoff function of A remains intact, the rest of the analysis is qualitatively identical. However, party F's new political rent in phase one (i.e., r'_P) can be higher or lower than the rent it asked in the initial model (i.e., $\hat{r}_P$). For example, suppose $\gamma = 0.8$. Then $r'_P > \hat{r}_P$ if $\lambda - v + r_I > 10$ and $r'_P < \hat{r}_P$ if $\lambda - v + r_I < 10$.

8.3 Proofs of Observations 1 and 5

Proof of Observation 1: Suppose $\gamma = \delta = 1/2$. If there is holdout, as assumed, then the following two conditions must be satisfied. The first condition comes from the requirement that $\alpha < \bar{\alpha}$ yielding

$$\Delta_1(\alpha, r_I) := \frac{(3-r_I)}{(r_I-2)^2} - \alpha > 0,$$

while the second condition comes from the fact that $\delta = 1/2 > \tilde{\delta}$, yielding

$$\Delta_2(\alpha, r_I) := 1/2 - \frac{1-r_I}{8\left(\frac{\sqrt{\frac{2(1-r_I)}{\alpha}}(r_I-1)-2r_I(r_I-2)}{2(r_I-2)} - r_I\right)} - \frac{\alpha r_I}{2} - \sqrt{\frac{\alpha(1-r_I)}{32}} > 0.$$

Consider Figure 6 that plots these two conditions and shows that for given $\alpha > 0$ there exist pairs (α, r_I) that falls in the area to the right of $\Delta_1(\alpha, r_I) = 0$ for which $\Delta_1(\alpha, r_I) > 0$ is satisfied and there exist pairs (α, r_I) that falls in the area below the curve $\Delta_2(\alpha, r_I) = 0$ for which $\Delta_2(\alpha, r_I) > 0$ is satisfied. It shows here $\Delta_2(\alpha, r_I) > 0$ is the binding constraint unless the existing institution is very good for which $\Delta_1(\alpha, r_I) > 0$ is the binding constraint.

Now consider the expression for economic surplus given by

$$ES(r_I) = \frac{1}{16(1-r_I)}$$

$$\left(\sqrt{\frac{2(1-r_I)}{\alpha}}(r_I-1)(3\alpha r_I - 2(\alpha-2)) + 2\alpha r_I^3 + r_I^2(11\alpha+16) - 2r_I(7\alpha+16) + 16\right).$$

Then, $\frac{\partial ES(r_I)}{\partial r_I} > 0$ if and only if

$$\Delta_3(\alpha, r_I) := (r_I - 1)(\alpha(9r_I - 8) + 4)\sqrt{\frac{1 - r_I}{\alpha}} + \sqrt{2}(\alpha(4r_I^3 + 5r_I^2 - 22r_I + 14) + 16r_I^2 - 32r_I + 16) < 0.$$

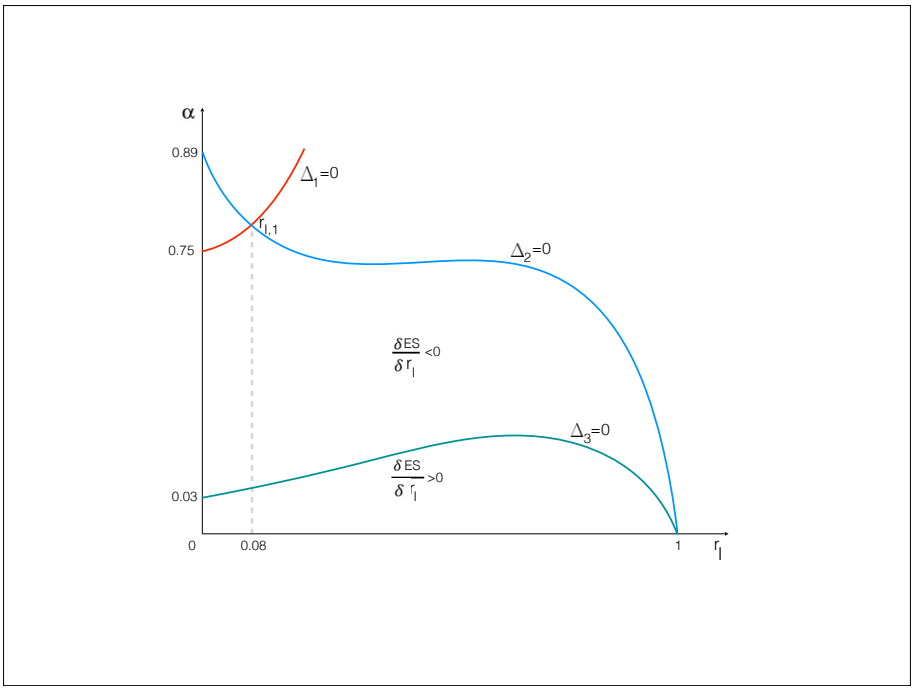

Figure 6: Effect of change in r_I with balanced party preferences.

Figure 6 plots $\Delta_3(\alpha, r_I) = 0$ so that $\Delta_3(\alpha, r_I) < 0$ holds true for pairs (α, r_I) that falls in the area below $\Delta_3(\alpha, r_I) = 0$. It shows that the zone where $\frac{\partial ES(r_I)}{\partial r_I} > 0$ is the area below the curve $\Delta_3(\alpha, r_I) = 0$ that consists of pairs (α, r_I) such that $0 \leq r_I \leq 1$ and $\alpha > 0$. The figure pinpoints two critical values of r_I. One is when $r_I = 1$ and the other is when the lines $\Delta_1(\alpha, r_I) = 0$ and $\Delta_2(\alpha, r_I) = 0$ intersect. We label this value as $r_{I,1}$. Note that in this example $r_{I,1} \approx 0.08$.

Thus there are two zones to consider:

- if the degree of legal weakness is relatively small (viz. $0 < r_I < r_{I,1}$) then there are two possibilities: the area below the line $\Delta_3(\alpha, r_I) = 0$ that is bounded by $r_{I,1}$ we have $\frac{\partial ES(r_I)}{\partial r_I} > 0$ while the area above $\Delta_3(\alpha, r_I) = 0$ that is bounded by $\Delta_1 = 0$ and $r_{I,1}$ we have $\frac{\partial ES(r_I)}{\partial r_I} < 0$.
- if the degree of legal weakness is relatively large (viz. $r_{I,1} < r_I < 1$) then there are two possibilities: the area below the line $\Delta_3(\alpha, r_I) = 0$ that is bounded by $r_{I,1}$ we have $\frac{\partial ES(r_I)}{\partial r_I} > 0$ while the area above $\Delta_3(\alpha, r_I) = 0$ that is bounded by $\Delta_2(\alpha, r_I) = 0$ and $r_{I,1}$ we have $\frac{\partial ES(r_I)}{\partial r_I} < 0$.

Next consider the impact of a change in α. Then, $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ if and only if

$$\Delta_4(\alpha, r_I) := (3r_I\alpha - 2(\alpha + 2))\left(\frac{1 - r_I}{\alpha}\right)^{\frac{3}{2}} - \sqrt{2}r_I(2r_I^2 + 11r_I - 14) < 0$$

Figure 7 plots the condition $\Delta_4(\alpha, r_I) < 0$ and shows that for given $0 \leq r_I \leq 1$ and $\alpha > 0$ there exist pairs (α, r_I) to the left of the curve $\Delta_4(\alpha, r_I) = 0$ for which we have $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$. The figure also pinpoints three critical values of α. One is when $\alpha = 0$ (with $r_I = 1$). The second is where the lines $\Delta_4(\alpha, r_I) = 0$ and $\Delta_2(\alpha, r_I) = 0$ intersect that we label as α_1 and the third one is where the lines $\Delta_1(\alpha, r_I) = 0$ and $\Delta_2(\alpha, r_I) = 0$ intersect that we label as α_2 with $\alpha_1 < \alpha_2$. Thus there are two zones to consider:

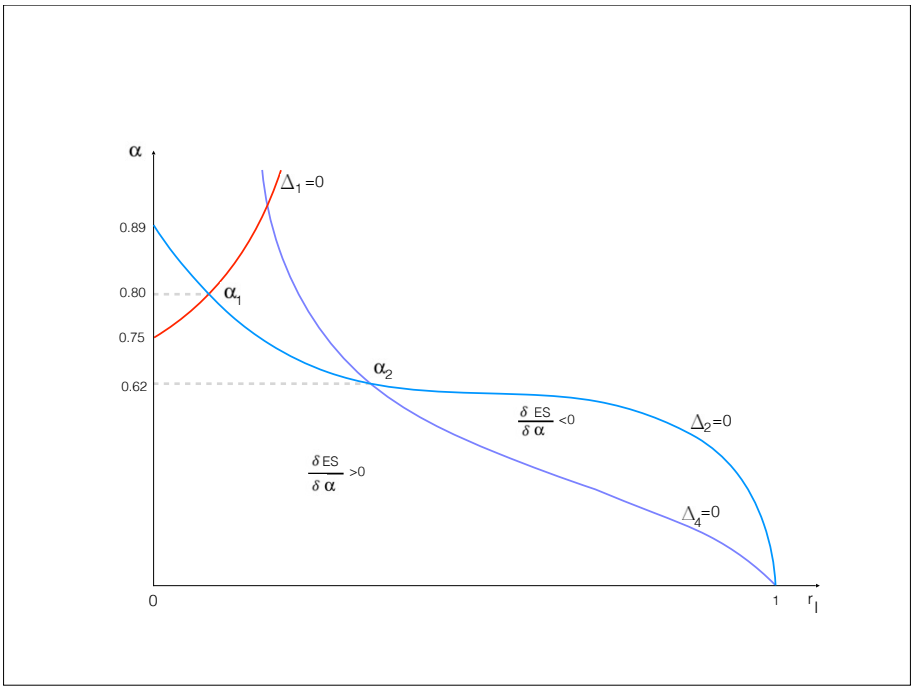

Figure 7: Effect of change in α with balanced party preferences.

- if the degree of political inefficiency is relatively large such that there is relatively higher degree of political opposition by A in the locality under consideration (viz. $0 < \alpha < \alpha_1$) then there are two possibilities: in the area to the left of $\Delta_4(\alpha, r_I) = 0$ that is bounded by α_1 we have $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ while the area to the right of $\Delta_4(\alpha, r_I) = 0$ that is bounded by $\Delta_2(\alpha, r_I) = 0$ we have $\frac{\partial ES(\alpha)}{\partial \alpha} < 0$.
- if the degree of political inefficiency is relatively small such that there is relatively lower degree of political opposition by A in the locality under consideration (viz. $\alpha_1 < \alpha < \alpha_2$) then the area that is bounded by $\Delta_1(\alpha, r_I) = 0$, $\Delta_2(\alpha, r_I) = 0$ and α_1 we have $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$.

□

Observation **5** *Suppose $\lambda = 2v = 2$. If there is strong ideological local opposition and strong rent-seeking local support for the project ($\gamma = \frac{2}{10}$ and $\delta = \frac{8}{10}$) then:*

1. *(a) For low degrees of legal weakness, $\frac{\partial ES}{\partial r_I} > 0$ irrespective of the degree of political weakness and (b) for high degrees of legal weakness, $\frac{\partial ES}{\partial r_I} > 0$ if degree of political weakness is large and $\frac{\partial ES}{\partial r_I} < 0$ if degree of political weakness is small;*
2. *(a) For low degrees of political weakness, $\frac{\partial ES}{\partial \alpha} < 0$ irrespective of the degree of legal weakness and (b) for high degrees of political weakness, $\frac{\partial ES}{\partial \alpha} < 0$ if the degree of legal weakness large and $\frac{\partial ES}{\partial \alpha} > 0$ if the degree of legal weakness is small.*

Proof of Observation 5:

Suppose $\gamma = \frac{2}{10}$ and $\delta = \frac{8}{10}$. In this case if there is holdout as assumed, then the following two conditions must be satisfied. As before, the first condition comes from the requirement that $\alpha < \bar{\alpha}$ yielding

$$\Delta_1'(\alpha, r_I) := \frac{16(9 - 4r_I)}{(4r_I - 5)^2} - \alpha > 0,$$

while the second condition comes from the fact that $\delta = \frac{8}{10} > \tilde{\delta}$, yielding

$$\Delta_2'(\alpha, r_I) := 4(1 - r_I) + 4(\alpha r_I - 4)\sqrt{\frac{2(1 - r_I)}{\alpha}} - 4r_I + 5 < 0.$$

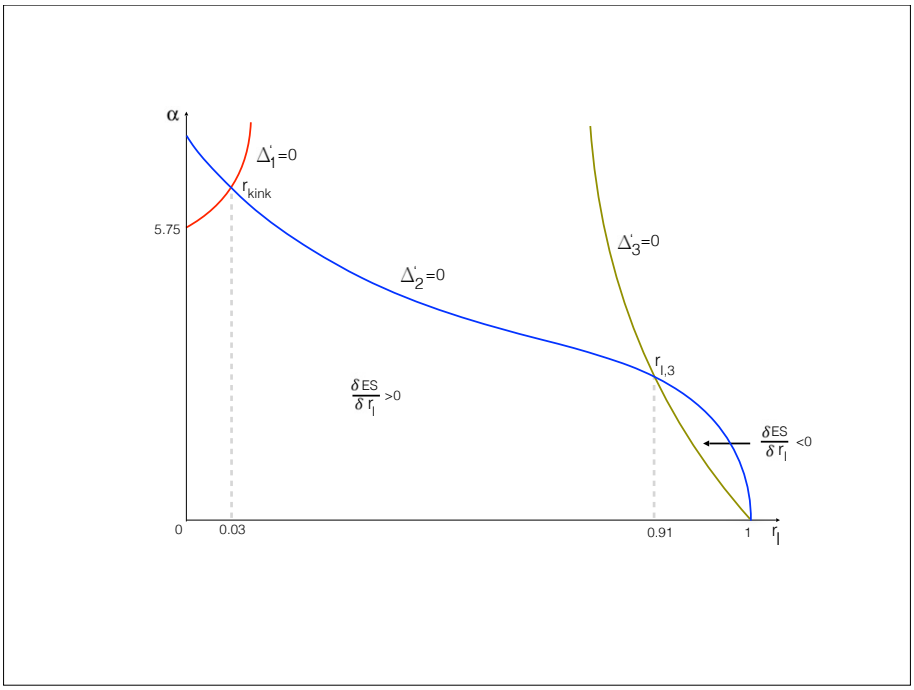

Figure 8: Effect of change in r_I with strong ideology and rent-seeking parties.

Consider Figure 8 that plots these two conditions and shows that given $\alpha > 0$ by assumption, condition $\Delta_1'(\alpha, r_I) > 0$ is satisfied for pairs (α, r_I) that falls in the area to the right of $\Delta_1' = 0$ and there exist pairs (α, r_I) that falls below $\Delta_2' = 0$ for which $\Delta_2'(\alpha, r_I) < 0$ is satisfied. It shows here $\Delta_2'(\alpha, r_I) < 0$ is the binding constraint unless the existing institution is very good, as in that scenario $\Delta_1'(\alpha, r_I) > 0$ is the binding constraint.

The expression for economic surplus in this example is given by

$$ES(r_I) = \frac{1}{2560(1-r_I)}$$

$$\left(\sqrt{\frac{2(1-r_I)}{\alpha}} 20(r_I - 1)(\alpha(12r_I + 49) + 64) + 8r_I^2(\alpha(10r_I + 307) + 320) - 5r_I(511\alpha + 1024) + 2560 \right).$$

Then $\frac{\partial ES(r_I)}{\partial r_I} > 0$ if and only if

$$\Delta_3'(\alpha, r_I) := (r_I - 1)(\alpha(36r_I + 25) + 64)\sqrt{\frac{2(1-r_I)}{\alpha}} + \frac{8r_I}{10}\left(\alpha(20r_I^2 + 277r_I - 614) + 320(r_I - 2)\right)$$

$$+\frac{5}{10}(511\alpha + 512) < 0.$$

Figure 8 plots the condition $\Delta_3'(\alpha, r_I) < 0$ that holds true for pairs (α, r_I) that falls in the area to the left of $\Delta_3'(\alpha, r_I) = 0$. The figure shows that there are two critical values of r_I where the lines $\Delta_2'(\alpha, r_I) = 0$ and $\Delta_3'(\alpha, r_I) = 0$ intersect. One is when $r_I = 1$ and we label the other as $r_{I,3}$ with $0 < r_{I,3} < 1$. Note that in this example $r_{I,3} \approx 0.91$. It also shows that there is one critical value of r_I such that $\alpha > 0$ and $0 \leq r_I \leq 1$ where the lines $\Delta_1' = 0$ and $\Delta_2' = 0$ intersect. We label this as r_{kink} with $0 < r_{kink} < r_{I,3}$. In our example $r_{kink} \approx 0.03$. Thus there are three zones to consider:

- If the existing institution is significantly inefficient ($r_{I,3} < r_I < 1$) then there are two possibilities: the zone above $\Delta_3'(\alpha, r_I) = 0$ that is bounded by $\Delta_2'(\alpha, r_I) = 0$ we get $\frac{\partial ES(r_I)}{\partial r_I} < 0$, while the zone below $\Delta_3'(\alpha, r_I) = 0$ that is bounded by $r_{I,3}$ we get $\frac{\partial ES(r_I)}{\partial r_I} > 0$;

- If the existing institution is moderately inefficient ($r_{kink} < r_I < r_{I,3}$) then the binding constraint is $\Delta_2'(\alpha, r_I) = 0$ and the zone below $\Delta_2'(\alpha, r_I) = 0$ that is bounded by r_{kink} and $r_{I,3}$ we get $\frac{\partial ES(r_I)}{\partial r_I} > 0$;
- If the existing institution is very efficient ($0 \leq r_I < r_{kink}$) then the binding constraint is $\Delta_1 = 0$. Thus in the zone to the right of $\Delta_1'(\alpha, r_I) = 0$ that is bounded by r_{kink} we again get $\frac{\partial ES(r_I)}{\partial r_I} > 0$.

Next consider the impact of a change in α. Then, $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ if and only if

$$\Delta_4'(\alpha, r_I) := \left(\sqrt{\frac{2(1-r_I)}{\alpha}}\right)^{\frac{3}{2}} (12 r_I \alpha + 49\alpha - 64) - r_I(8r_I^2 + \frac{2456}{10} r_I - \frac{2555}{10}) < 0$$

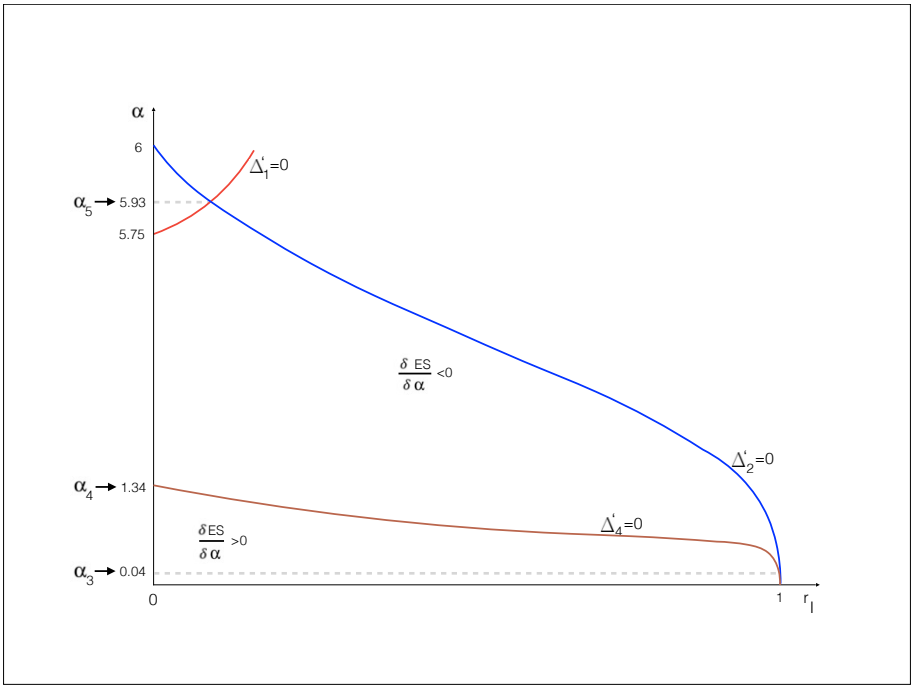

Figure 9: Effect of change in α with strong ideology and rent-seeking parties.

Figure 9 plots the condition $\Delta_4'(\alpha, r_I) < 0$ that holds true for pairs (α, r_I) that falls in the area below $\Delta_4' = 0$. It shows that the zone where $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ is the area below the curve $\Delta_4' = 0$ that consists of pairs (α, r_I) such that $0 \leq r_I \leq 1$ and $\alpha > 0$. The figure also pinpoints three critical value of α. One is when $\Delta_4'(\alpha, r_I) = 0$ and $\Delta_2'(\alpha, r_I) = 0$ intersect that we label as α_3. In this example $\alpha_3 \approx 0.04$. The second one is when $\Delta_1'(\alpha, r_I) = 0$ and $\Delta_2'(\alpha, r_I) = 0$ intersect that we label as α_5. In this example $\alpha_5 \approx 5.93$. And the third one is α_4 such that $\alpha_3 < \alpha_4 < \alpha_5$. In this example $\alpha_3 \approx 1.34$. Thus there are three zones to consider:

- if there is sufficiently low degree of political weakness such that there is a sufficiently low degree of local presence of A in the locality under consideration (viz. $\alpha_4 < \alpha < \alpha_5$) then the area bounded by $\Delta_1'(\alpha, r_I) = 0$, $\Delta_2'(\alpha, r_I) = 0$ and α_4 such that we have $\frac{\partial ES(\alpha)}{\partial \alpha} < 0$.
- if there is intermediate degree of political weakness such that the degree of local presence of A is intermediate in the locality under consideration (viz. $\alpha_3 < \alpha < \alpha_4$) then there are two possibilities: in the area below $\Delta_4'(\alpha, r_I) = 0$ that is bounded by α_3 we have $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ while the area above $\Delta_4'(\alpha, r_I) = 0$ that is bounded by $\Delta_2'(\alpha, r_I) = 0$ and α_4 we have $\frac{\partial ES(\alpha)}{\partial \alpha} < 0$.
- if there is sufficiently high degree of political weakness such that there is a sufficiently high degree of local presence of A in the locality under consideration (viz. $\alpha < \alpha_3$) then the area bounded by $\Delta_2'(\alpha, r_I) = 0$ and α_3 we have $\frac{\partial ES(\alpha)}{\partial \alpha} > 0$ irrespective of the existing degree of legal weakness.

8.4 Exogenous interference: a misleading specification for seller welfare and economic surplus

We begin with Seller utility. Consider a scenario where r_p and c are fixed. Recall that the sellers' payoff is $\pi(k)(qk + (1-k)(q_B - (1-\beta)r_I)) + (1-\pi(k))v$. Substituting the values of k^*, q and q_B from Sections 3.1 and 3.2 we get

$$U_S = \frac{\lambda - v - r_I}{4(r_P - r_I)}\left(\frac{\lambda - v - r_I}{2}\right) + v = \frac{(\lambda - v - r_I)^2}{8(r_P - r_I)} + v.$$

Now,

$$\frac{\partial U_S}{\partial r_I} = \frac{(\lambda - v)^2 - r_I^2 - 2r_P(\lambda - v - r_I)}{8(r_P - r_I)^2}.$$

Note that $\frac{\partial U_S}{\partial r_I} > 0$ if and only if $r_P < \frac{(\lambda-v)^2 - r_I^2}{2(\lambda - v - r_I)}$. Next recall that there is holdout whenever $r_P > r_I + \frac{\lambda - v - r_I}{4}$. Thus both these inequalities hold iff

$$\frac{(\lambda - v)^2 - r_I^2}{2(\lambda - v - r_I)} > r_P > r_I + \frac{\lambda - v - r_I}{4}.$$

It is routine to check that $\frac{(\lambda-v)^2 - r_I^2}{2(\lambda - v - r_I)} > r_I + \frac{\lambda - v - r_I}{4}$ for any parameter configuration. Thus, whenever r_P is neither too large, nor too small, an increase in bureaucratic corruption unambiguously improves seller utility.

Next consider the case of Economic Surplus in relation to Observation1. Consider r_P and c as given parameters. Using the expression for U_B and substituting the values of k^* (from (7)), q and q_b (from Lemma 2), we get

$$U_B = \frac{(\lambda - v - r_I)^2}{16(r_P - r_I)},$$

so that

$$ES = \frac{3(\lambda - v - r_I)^2}{16(r_P - r_I)} + v - (1+\alpha)c.$$

Now, $\frac{\partial ES}{\partial \alpha} = -c < 0$ and

$$\frac{\partial ES}{\partial r_I} = \frac{3(2r_P(r_I + v - \lambda) - r_I^2 + (\lambda - v)^2)}{16(r_P - r_I)^2}.$$

Note that $\frac{\partial ES}{\partial r_I} > 0$ if and only if $r_P < \frac{\lambda - v + r_I}{2}$. Recall that there is holdout whenever $r_P > r_I + \frac{\lambda - v - r_I}{4}$ Thus in presence of holdout $\frac{\partial ES}{\partial r_I} > 0$ whenever $\frac{\lambda - v + r_I}{2} > \frac{\lambda - v - r_I}{4} + r_I$, which holds if and only if $\lambda - v > r_I$. But this is always true for given $\lambda - v - r_I > 0$. This suggests clear impacts of change in r_I and α on economic surplus when interference is exogenous. In particular, worsening of institutions (a fall in α or a rise in r_I) increase economic surplus. Such conclusions are clearly misleading. □

Table 2: The status of land acquisition based on Chakrabroty (2013), the corruption perception in the land administration department in 2005 and 2008 and the history of political violence for the years 1960 – 2004 as well as updated land acquisition status for erstwhile 'Contested' cases

States	Location (Participant(s); Project)	Year based on Chakraborty (2013)	Land acquisition status based on Chakraborty (2013)	Corruption perception in land administration department in 2005 (in %)	Corruption perception in land administration department in 2008 (in %)	History of political violence for the years 1960-2004 (number of deaths)	Year (updated by authors)	Land acquisition status (updated by authors; previously 'Contested' status has been updated)	Land acquisition status narrative (updated by authors)	Source for updated status by authors
Andhra Pradesh	Hyderabad, Quila Mohammed Nagar (AP Tourism Development Corporation, Golf Course)	2006	Contested	0.81	0.81	139	2013	Successful	Farmers offered alternative land and an increased compensation	New Socialist Initiative (NSI) on 17.04.2013 http://nsi-delhi.blogspot.com.au/2013/04/of-public-purpose-beauty-and-other.html
	Hyderabad, Ranga Reddy District, Gopannapalli village (State Government, IT Complex)	2006	Contested	0.81	0.81	139	2015	Contested		http://www.hmda.gov.in/LandBankData/RR_District_Mandal_Lands.pdf
	Komarada, Vizianagaram district (Private thermal power plant)	2010	Contested	0.81	0.72	139	2016	Contested		Hindu, Srikakulam/Vizianagaram, May 27, 2016 http://www.thehindu.com/news/national/andhra-pradesh/central-projects-land-acquisition-a-daunting-task/article8652269.ece
	Mahbubnagar district, Polepally (State Government, SEZ)	2009	Contested	0.81	0.72	139	2014	Successful	Acquisition was forceful targeting mostly backward classes to avoid strong resistance, discriminated compensation scheme	Rawat et al., 2011, retrieved from http://www.indiaenvironmentportal.org.in/files/WEB_SDF_India_final_layout.pdf Also see https://ejatlas.org/conflict/polepally-special-economic-zone-telangana-india
	Rajaiahpet village, Vishakhapatnam (Anrak Aluminium, Port for aluminium plant)	2010	Contested	0.81	0.72	139	2010	Successful	Landowners offered only price for land but no compensation for displacement as homestead land plots have been strategically avoided	Oskarsson, P. 2009 Retrieved from http://www.academia.edu/3781587/Zoning_Andhra_Pradesh_Land_for_SEZs_via_a_land_for_the_poor_program
	Machilipatnam (Railway administration, Navayuga Engineering Company Ltd; Port)	2010	Contested	0.74	0.60	42	2015	Contested	More compensation sought	http://www.thehindu.com/news/national/andhra-pradesh/machilipatnam-portrs-700-crore-required-for-land-acquisition/article6876312.ece
Chandigarh	Manimajra (UT Government, Technology Park)	2007	Contested	0.71	0.71	28	2012	Contested	Initially acquired but the Supreme Court quashed the land acquisition as it violated the Law	The Tribune, October 12, 2012, retrieved from http://www.tribuneindia.com/2012/20121012/main2.htm
Chhattisgarh	Raigarh (Navin Jindal Group, Power plant)	2008	Successful	0.76	0.86	58	2008	Successful		

	Bastar (Tata Steel, Steel plant)	2011	Contested	0.76	0.86	58	2013	Successful	Information asymmetry in terms of legal provisions, landowners were not consulted	Global research, April, 2013. Retrieved from http://www.globalresearch.ca/the-bastar-land-grab-the-expropriation-of-farmers-in-india/5332410
	Janjgir-Champa district (NTPC, KSK Energy; Thermal power plant)	2011	Contested	0.76	0.86	58	2016	Successful	Compensation increased from the initial offer of Rs 1.2-2.3 lakh per acre to Rs. 17 lakh per acre, force involved	http://www.sourcewatch.org/index.php/KSK_Mahanadi_Power_Project
	Naya Raipur (State Government; New Town, Capital)	2008	Contested	0.76	0.86	58	2014	In progress	Landowners are happy with the increased compensation and annuity	Economic Times, 2014. Retrieved from http://articles.economictimes.indiatimes.com/2014-06-22/news/50772399_1_new-city-naya-raipur-development-authority-acres
Goa	Dabolim (DLF Limited; Real Estate)	2010	Successful	0.71	0.875	7	2010	Successful		
	Navelim (State Government; Sewage treatment plant)	2011	Contested	0.71	0.875	7	2015	In progress	Initially acquired but the proposal to revert the agricultural land to the farmers is in final stage and pending cabinet approval.	The Navhind Times, May, 2015. Retrieved from http://www.navhindtimes.in/salcete-farmers-to-get-back-acquired-farmland/
	Navelim (NHAI; Highway widening)	2010	Contested	0.71	0.875	7	2010	In progress	Landowners willingly gave No objection Certificates (NoCs) as the highway project was demanded by locals	The Navhind Times, November, 2015. Retrieved form http://www.navhindtimes.in/navelim-jakniband-road-widening-to-start-by-dec-says-avertano/
	Panaji (Central and State Governments; New airport)	2010	Contested	0.71	0.875	7	2016	Contested	Part of the required land is taken forcefully.	http://www.heraldgoa.in/Edit/Editorial/The-people-of-Goa-are-paying-more-than-the-Mopa-developer-is/98328.html and http://articles.economictimes.indiatimes.com/2016-03-15/news/71543136_1_airport-project-sandip-kambli-mopa
Gujarat	Mundra (Adani Group; Port and SEZ)	2008	Successful	0.71	0.70	328	2008	Successful		
	Rural, south (Power Grid Corporation of India Limited; Power lines)	2010	Contested	0.71	0.70	328	2010	Contested	The Government issued order for acquisition of land under `public purpose' in 21 projects issued during 2013 and 2014.	Gazette Notifications, GoI, 2015. Retrieved form http://www.governancenow.com/files/GOI-LAQnotifics-tabulatedsummary-prelimfindings-dissemdoc-Jul15.pdf
	Bhavnagar district, Mahuva	2010	Contested	0.71	0.70	328	2010	Contested	Stalled until the	http://www.downtoearth.org.in/news/ngt-order-clears-way-

	(Nirma, State Government; Cement plant, limestone mining)								land allotted is proven to be a wasteland	for-nirma-cement-plant-at-cost-of-wetland-48311 and https://ejatlas.org/conflict/mahuva-movement-against-proposed-nirma-cement-plant-india
Haryana	Manesar (State Government; Industrial zoning)	2011	Contested	0.80	0.56	399	2014	Failure	The State Government decided to look for less fertile lands nearby	http://timesofindia.indiatimes.com/city/chandigarh/State-drops-3664-acre-Manesar-Bawal-logistic-hub/articleshow/45622902.cms
	Yamunanagar	2009	Contested	0.80	0.56	399	2014	Successful	Farmers are offered employment	http://www.cityairnews.com/content/hooda-gives-away-appointment-letters-dependents-59-land-oustees-dcrtpp-yamyna-nagar
Himachal Pradesh	Una district (State Government; Airport and aircraft SEZ)	2009	Contested	0.70	0.23	49	2009	Contested	Project likely to be abandoned	*Tribune*, December 2009
Jharkhand	Chandil (Moser Baer; Power plant)	2008	Successful	0.83	0.75	180	2008	Successful		
	Potka (Bhusan steel; Steel plant)	2011	Contested	0.83	0.75	180	2016	Contested	Project on hold due to lack of administrative clearances and land acquisition issues	http://www.construction-ic.com/HomePage/Projects?ReturnUrl=%2FProjects%2FOverview%2F114400%3Futm_source%3Dworldconstructionnetwork%26utm_medium%3DReferral%26utm_campaign%3DBPSL%2B%25E2%2580%2593%2BPotka%2BIntegrated%2BSteel%2BPlant%253A%2BCaptive%2BPower%2BPlant%2B900%2BMW%2B%25E2%2580%2593%2BJharkhand&utm_source=worldconstructionnetwork&utm_medium=Referral&utm_campaign=BPSL%20–%20Potka%20Integrated%20Steel%20Plant%3A%20Captive%20Power%20Plant%20900%20MW%20–%20Jharkhand#
	Torpa (LN Mittal Group; Steel plant)	2008	Failure	0.83	0.75	180	2008	Failure		
	Saraikela (Tata Steel; Steel plant)	2011	Contested	0.83	0.75	180	2014	Contested	Pending by order from DC for deposition of land value	http://jharkhandindustry.gov.in/MOM1872014.pdf
	Purbi Singbhum (PWD and NHAI; Highway widening)	2010	Contested	0.83	0.75	180	2016	Heading towards success		http://www.telegraphindia.com/1160125/jsp/jharkhand/story_65674.jsp#.V4my_TfGKrc And http://www.ercindia.org/files/eiadocuments/eiareports/11.06.2013_EIA_nh6.pdf
Karnataka	Bangalore-Mysore corridor (State Government; Highway)	2010	Contested	0.83	0.859	39	2014	Successful	Landowners are offered multi-fold increases in compensation	http://www.thehindu.com/news/cities/bangalore/bmic-project-land-losers-can-cheer/article6725468.ece
	Belgum district, Hukkeri taluk (Zuari Fertlizers and Chemicals Ltd, Karnataka Industrial Areas Development Board; Petrochemical plant)	2010	Contested	0.83	0.859	39	2014	Contested	Government ordered to change the location from Mastihole Village to Kanagala Village in Belagavi District, land allotment reduced	Government order No. CI 265 SPI 2014, Bengaluru, Dated: 10.12.2014,PR. 164, SC. 10. Retrieved from http://www.gazette.kar.nic.in/30-4-2015/Part-1-(Page-441-464).pdf

									from 100 acre to 50 acre	
	Mangalore (ONGC and Karnataka Industrial Areas Development Board; SEZ)	2009	Contested	0.83	0.859	39	2011	Contested	1,997 acres of the required land has been de-notified.	DNA India, July, 2011. Retrieved from http://www.dnaindia.com/bangalore/report-mangalore-sez-land-goes-posco-land-secure-1565237
Maharashtra	Lower Penganga valley (State Government; Irrigation)	2009	Contested	0.67	0.82	162	2016	Contested	Feasibility of the project has been questioned	https://sandrp.wordpress.com/2015/07/15/lower-penganga-project-two-decades-after-inception-the-struggle-continues/
	Mauda, Nagpur (NTPC; Power plant)	2010	Contested	0.67	0.82	162	2011	Successful	Farmers have been provided with enough compensation	http://timesofindia.indiatimes.com/city/nagpur/NTPC-plant-powers-Mouda-farmers-to-prosperity/articleshow/10823439.cms
	Nagpur (State Government; Multi-modal International Airport Hub at Nagpur)	2008	Contested	0.67	0.82	162	2009	In progress	Some parts completed in 2009	http://www.thehindubusinessline.com/economy/logistics/boeing-amazon-explore-investing-in-multimodal-cargo-hub-at-nagpur/article6805643.ece
	Nanded (Maharashtra Industrial Develoment Corporation; Industrial Estate)	2011	Contested	0.67	0.82	162	2015	Successful	Higher compensation provided	http://indianexpress.com/article/cities/mumbai/land-acquisition-government-offers-farmers-maximum-compensation/
	Pune-Ahmednagar Highway (State Government and Videocon; IT SEZ)	2009	Contested	0.67	0.82	162	2009	Failure	Project cancelled due to increased resistance	http://www.hindustantimes.com/mumbai/state-scraps-videocon-sez-project-near-pune/story-e0Y8Tz0yxJbQRItTUPghmM.html and http://epaper.timesofindia.com/Default/Layout/Includes/ETNEW/ArtWin.asp?From=Archive&Source=Page&Skin=ETNEW&BaseHref=ETM%2F2010%2F01%2F01&GZ=T&ViewMode=HTML&EntityId=Ar00301&AppName=1
	Jaitapur, Ratnagiri district (State Government; Nuclear power plant)	2010	Contested	0.67	0.82	162	2015	Contested	Consistent protests due to livelihood and environmental concerns	http://www.hindustantimes.com/india/ratnagiri-villagers-fight-on-against-jaitapur-nuclear-power-project/story-GQCXJgpYKbOkaZnvbYyJVL.html
Odisha	Gopalpur (Tata Steel; Steel plant)	2008	Failure	0.75	0.45	18	2008	Failure		
	Paradip (Essar Group; Steel plant)	2011	Successful	0.75	0.45	18	2011	Successful		
	Paradip (Posco; Steel plant)	2011	Contested	0.75	0.45	18	2015	Contested	Problems with land acquisition by the State government	http://post.jagran.com/odisha-optimistic-to-see-posco-plant-near-paradip-1437208448 and http://indianexpress.com/article/business/business-others/posco-starts-pull-out-from-orissa/
	Kasaphal (LN Mittal Group; Steel plant)	2008	Failure	0.75	0.45	18	2008	Failure		
	Kalinganagar (Tata Steel; Steel plant)	2011	Contested	0.75	0.45	18	2015	Successful	Higher amount of compensation paid	http://www.business-standard.com/article/companies/tata-steel-taps-hot-metal-from-kalinganagar-project-116031700685_1.html
Rajasthan	Barmer (Sajjan Jindal Group; Power plant)	2008	Successful	0.82	0.77	4	2008	Successful		
	Bagru (Mahindra Group; SEZ)	2008	Successful	0.82	0.77	4	2008	Successful		

Tamil Nadu	Irungattukottai (Hyundai Motors; Car plant)	2008	Successful	0.74	0.60	42	2008	Successful		
	Maraimalainagar (Mahindra group; SEZ)	2008	Successful	0.74	0.60	42	2008	Successful		
	Tuticorin (Tata Steel; Titanium dioxide project)	2008	Failure	0.74	0.60	42	2008	Failure		
	Peelamedu, Chinniapalayam, Chennai (Airports Authority of India; Airport expansion)	2010	Contested	0.74	0.60	42	2012	Successful	Higher amount of compensation paid	http://coimbatore.nic.in/transport.html and https://en.wikipedia.org/wiki/Coimbatore_International_Airport
Uttar Pradesh	Unnao (UP State Industrial Development Corporation; three SEZs)	2007	Contested	0.81	0.81	388	2015	Successful	Peaceful negotiation and higher amount of compensation	http://swarajyamag.com/politics/land-acquisition-learn-from-the-states
	Yamuna expressway (State Government; Highway)	2010	Contested	0.81	0.651	388	2012	Successful	Peaceful negotiation and higher amount of compensation	http://swarajyamag.com/politics/land-acquisition-learn-from-the-states and http://www.hindustantimes.com/noida/yamuna-expressway-authority-to-give-possession-of-1-000-plots-in-2009-scheme/story-6BMj3i5sa6jZr13I5NlySJ.html
West Bengal	Salboni (Sajjan Jindal Group; Steel plant)	2008	Successful	0.74	0.45	292	2008	Successful		
	Andal, Burdwan (State Government; Airport expansion and industrial hub)	2010	Contested	0.74	0.45	292	2013	Successful	Better compensation offered	http://www.telegraphindia.com/1110511/jsp/business/story_13967277.jsp
	Burdwan district, Burnpur-Purushottampur (IISCO; Steel plant expansion)	2008	Contested	0.74	0.45	292	2015	Successful	Better compensation offered	http://www.thestatesman.com/news/bengal/india-s-largest-blast-furnace-plant-opens/62522.html http://www.thehindu.com/todays-paper/tp-national/tp-otherstates/pm-to-open-18000cr-steel-plant-today/article7189151.ece
	Burdwan district, Panagarh (State Government., Matrix Fertilizers and Chemicals; Petrochemicals plant)	2011	Contested	0.74	0.45	292	2012	Successful	Higher compensation paid	http://duncansfertiliser.blogspot.in/2011/08/matrix-fertilisers-to-commission-its.html
	Kolkata, Rajarhat (Infosys Technologies Ltd, IT complex)	2010	Contested	0.74	0.45	292	2015	Contested	Land acquired but the status of SEZ is in limbo.	http://www.dnaindia.com/money/report-infosys-expresses-concern-over-wb-government-s-inaction-over-proposed-centre-2050024 and http://profit.ndtv.com/news/corporates/article-infosys-wants-bengal-to-give-sez-status-to-rajarhat-centre-760659

Note: For the first four columns, the source is Table A1 and Table A2, "The Price of Land: Acquisition, Conflict, Consequence", by Sanjoy Chakravorty, OUP 2013. The "Year" refers to the year of reporting these incidents in the media (mainly newspapers). The updated land acquisition status has been presented from Column 8 onwards; the data has been updated for the erstwhile 'Contested' cases only. The land acquisition status data is for the years 2006 – 2016. Note that the history of political violence corresponds to total number of deaths in states. In column 7, we report the average deaths per district by diving the total deaths with the numbers of districts/locations (in column 2) in each states. Note that for Chandigarh, the corruption perception values are the all India values as there are no data for Chandigarh for these two years.