Protest, Violence and Investments

Essays on the Political Economy of Less Developed Countries

Abhinandan Sinha

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Supervisor
Prof. Abhirup Sarkar

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Contents

Abstract

This thesis attempts to develop a formal literature of the political economy of Less Developed Countries (L.D.C.s) with three different questions-protest, violence and investments with the interlinking theme of coordination failures in collective action and its effects on economic development. The first chapter provides a theoretical analysis of civil society activism and development. When citizen-activists observe a noisy signal about unwilling land losers being evicted by the Government for a development project, they protest against the forceful land acquisition for the project. We find an increasing role of ideological activism to have a positive welfare effect on raising the compensation for the land losers but a negative effect on the chances of the project's success. In an extended model with political campaign, ideological activism and Incumbent's politicization are complementary.

In the second chapter, we formally establish the relationship between political violence and the informal sector. When large sections of the population work in a semi-legal environment of the informal sector needing political protection for survival of livelihood, it gives rise to political clientelism. Violence is the tool through which the political parties send the signal of their de facto political strength to the informal sector workers to gain their support. We find that an increase in the size of informal sector employment, clientelistic benefit and the ideological spectrum of the formal sector voters increases political violence, and also increases the winning chances of the worse performing party, where as a rising competition in the performance among the formal sector voters decreases political violence by both the parties and increases winning chances of the better performer. We also explain the puzzle of why well-performing incumbents engage in high violence in a democracy.

The final model represents a backward economy where the Government invests in a costly effort to switch to a modern sector by attracting capital investments. Investors take investment decisions based on a noisy signal about

the overall investment climate of the region. Strategic complementarity in profits resulting from positive externalities from the investments gives rise to a coordination problem, turning investments into a collective action. We establish the conditions under which the roles of local and foreign investors become complementary or substitutes in a poor economy. A political constraint on the Government increases the government's effort for investments when welfare transfers for ensuring votes are costly, and reduces the effort for cheaper transfers. The findings explain how a poor region with a democratic political system runs the risk of falling into a perpetual low investment trap.

In each chapter, the formal treatment in modelling the coordination and collective action consists of Global Games, which help to solve the problems of multiplicity of equilibria.

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Chapter 1

Introduction

Is the current framework of standard political economic literature sufficient to explain the experiences of less developed economies (L.D.C.s)? Or the other way- do we at all need a different political economy literature for the poor countries? These questions are as important in the political economy as in the literature of development economics.

It's widely accepted by now that the quality of democracy is much questionable in developing countries. Even with regular multiparty elections, the day-to-day practice of democracy is characterized by many abuses. Bratton and van de Walle (1997) and van de Walle (2001) opined it to be not surprising because many of the underlying factors which led to weak or no democracies historically in many developing countries continued to exist till the recent decades.[1] Thus, the issue of under-development in L.D.C.s is related to its political economy because the economic policies chosen by the political party in Government's office works under various political constraints. These constraints, arising from the diverse real life experiences in the L.D.C.s may not get reflected in the standard literature currently dominant in economics. This calls for a different kind of treatment in the formal models to incorporate such critical influences on the choices of development. Our thesis falls in the crossroad of the political economy and development, focusing on the less-developed economies.

In the study of political and policy decisions, studying the political system is very crucial. Political systems of L.D.C.s range from multiparty democracies to dictatorships. In standard political economy models, ob-

[1]For example, subversion of democratic rule by the leader or small elite is one such feature gaining much attention in the literature (Jackson and Rosberg (1984b)).

jective functions of the leaders are weighted averages of different variables, where the weights are exogenous. The choice of the variables depend on specific contexts and the leaders have to make their choices under various kinds of constraints. These constraints arise from different prevailing realities. To understand them, a distinct qualitative approach is needed. There can be no single grand model of political economy which can be applied across all the political systems of L.D.C.s, nor can there be any single framework of their conceptual analysis for developing a literature of its own. The issue is to choose such an underlying framework of conceptual analysis.

A recent literature has seen some work on non-democratic politics of L.D.C.s, with focus on Africa etc. There are some signifying, although not exhaustive features commonly considered to describe the political economy of developing countries. These are also seen by the policy makers as their key problems. Absence of democratic traditions (Sandbrook [1985]), ethnic fragmentation and tensions (Posner [2005]), low population densities (Herbst [2000], Boone [2003]) characterize many such economies. This thesis deals with an electoral system of political democracy, more relatable to the South-Asian developing countries, that has received less focus till date, especially in theoretical literature.

The explanations I offer in this thesis deal with three distinct major features of the L.D.C.s - civil society protests against violation of democratic rights, pervasiveness of political violence with a large informal economy and perpetual backwardness in investments. These three features are relatively less-discussed in the formal literature of economic theory, especially in the context of the political dynamics in poor countries. To understand the contribution of this thesis to the current literature, our approach needs to be explained clearly.

The decade of 1950 saw a strong group of development economists arguing against the application of standard economic theory for explaining the issues of less-developed countries (L.D.C.s). One of the most prominent scholars among them, Hirschman (1958) even suggested against the widespread usage of formal models per se. This had called for sharp criticism from economists like Paul Krugman et al. and Theodore W. Schultz in his Nobel Address (1990) criticized them by saying, 'This branch of economics has suffered from several intellectual mistakes.' But this did little to put the debate to rest and the debate later extended to the researchers of political economy as well.

Different political systems make the leaders choose different political

mechanisms of exchanges through which they garner political support to retain power in a democracy. These vary from promises (and hence their credibility), to monetary and in-kind incentives. Political mechanisms determine policy choices, and its most important role is in shaping the bargain between the Government and the electorate, especially various interest groups of the society. These give rise to a variety of political constraints for the leaders. Thus the quality of the institutions that make such systems function is a major determinant of the different policy choices in underdeveloped countries. Even if all regimes face the same basic decisions, with leaders facing the same basic problem of support for themselves and their policies across countries and their political systems, a variant analysis or modeling is required. A deeper conceptual framework is needed for such models to evolve.

A casual look at different empirical evidence over time on various unrelated issues also affirm and motivate our approach. For example, the political budget cycle forms a major component in the studies of political economy. It is widely established that budget manipulation for electoral purposes is far stronger in developing countries than developed countries (Shi and Svensson 2006). Brender and Drazen (2005a) counter argue that the political budget cycle phenomenon is caused by the newness of a democracy. But new democracies also comprise a larger fraction of the developing countries as well. A common argument is that for such political budget cycles to persist, democratic institutions must be weaker for such political manipulations to take place.[2] This thesis also looks at other effects of weak institutions, and the economic and political consequences emerging from it.

Another related argument is that are voters more vulnerable and get easily manipulated in these weak democracies of developing countries than the developed ones? Brender and Drazen (2005b) have found that indeed voters in L.D.C.s appear to be different in their responses to budget deficits and economic growth.[3] These all indicate the need for a separate structure of understanding the mechanisms in developing economies. In a similar spirit, in one of the chapters of this thesis, we model differences in preferences and responses of different *class* of voters employed in different sectors of the

[2]For example, Brender and Drazen [2005a] found that the political budget cycle is stronger in countries with lower levels of democracy.

[3]But in larger politics and electoral outcomes this claim is empirically contested too. Ample evidence of salience over identity politics superseding economic dimensions can be found, which comprises another dominant characteristic feature in the political economy of poor countries.

economy to have differential preferences and responses over the economic performances of the parties.

The need for such a literature to evolve was widely accepted with time not only in economics, but generally in social science too.[4]. We believe that in the formal literature of economic theory, a part of this debate is misplaced, to the extent of centering around the mechanical application of the formal tools. The debate over technical formality within a rational, neo-classical framework has not much of a relevance in the long for showing any direction of better explanation of the L.D.C. experiences. The real concern lies in the difference over issues of systems, incentives, constraints, choice-mechanisms and socio-cultural behavior and norms and debating over mechanical application of the same formal models is often misplaced. The crux of the matter lies in which aspects of politics need to be emphasized; delicately modelling the qualitative behavior of the agents, and the exogenous factors behind them.

Gerry Meier had long raised questions about whether the *New Political Economy*[5] is relevant for the LDCs. Ronald Findlay in 'Is the New Political Economy Relevant to Developing Countries?' agreed that the literature of 'New Political Economy' generally presumes political conditions vastly different from those prevailing in a typical L.D.C. He argued for novelty and imagination in the methods and spirit of 'New Political Economy' to be applied to the conditions prevailing in different types of L.D.C.s.

Conclusively, even within the standard framework of currently dominant literature, the study of the political economy of poor countries needs to build new kinds of models and hence develop new literature for a better understanding and explanation. With this aim, this thesis has chosen three signifying issues - with three different contests and questions. On a broader theme, the questions can be linked to coordination failures in collective action in the political economy of development. On a micro level, each model has a common feature under three different scenarios - *herd behaviour*.

Collective action is the general structure of the agents' behaviour in each of the chapters of this thesis. In fact, this characteristic feature of collective

[4]For example, Partha Chatterjee Political Economy of 'Political Society'

[5]In contemporary literature, the latest development of 'new political economy' refers to the extensive work done over recent decades constituting different prominent streams like 'public choice', 'rent-seeking', 'new institutional economics' etc. The pioneers have been Anthony Downs, Mancur Olson, James Buchanan, Gordon Tullock and Douglass North. These distinct approaches collectively presented a framework of political institutions and behavior that corresponds to mostly the advanced industrial countries.

action is the linking theme of the broadly three different questions in the context of L.D.C.s where we witness herd behaviour. This thesis studies three applications of coordination problems in collective action, viz. *protests*, *strategic voting*, and *investments*.

Our protest model in the first chapter captures civil society activism in the context of land acquisition and eviction, and its effect on development and policy choices. We find that ideological activism increases the compensation for land losers, but non-ideological activism increases the chances of development.

In the political economy of a region, interest groups, apart from giving strong bargaining voices, also play a major role in resisting elite captures of the institutions. The strength of interest groups are different, and generally higher in developing countries than the developed ones. But certain kinds of interest groups do play powerful roles in the political economy of developing countries too. They differ in nature, characteristics and composition with the strong interest groups in developed countries. Civil society activism can be broadly interpreted as behaving like an interest group in giving a voice to the vulnerables. The absence of significant constitutional advocacies or vibrant civil society tradition mean that governments of the developing world might be forced to rely of ethnic loyalties to bolster (or to take the place of) popular legitimacy. Collective action, which is the connecting theme of this thesis, facilitates interest group formation which gets greatly shaped by politics.

A fruitful approach, as has been characterized in some formal models of political economy in less developed democracies, is to assume that greater power reflects fewer constraints on leaders. These stem from the weakness of the democratic and legal institutions, which is more for the developing countries, but also stem from the political culture and civil society activism.[6] We follow this perspective in this thesis's framework.

Our model of civil society activism has a context of land acquisition and eviction, which deals with another interest group - the farmers of the land-losers. In general, there is ample evidence that politicians often favour interest groups of various kinds of elites, often at the expense of other classes. For example, prices are set in such a way that it favours the interests of industry at the cost of agriculture, and favouring large farmers than small or landless peasants within agriculture. Small farmers are relatively inac-

[6]One can see Van de Walle's (2001) argument that leaders in Africa are more secured from popular pressures than in developed countries.

tive in lobbying politics because the poors and relatively vulnerable sections have less bargaining power in interest group politics as most of them cannot afford the cost of collective action. Comparatively large farmers and industrialists are powerful elites to capture democratic and consequently economic institutions. For example, Bates (1981) argues that lack of organization of vulnerable groups allows governments to sustain policies which favour interests of the elites. (For insightful discussions in relation to agricultural interests in Africa, see Bates [1983]) The kind of voice influential in the politics of developing countries are much different from their counterparts in the developed economy. Even within developed countries, such groups are found to be heterogeneous, varying across diverse regions. The root cause of this contrast lies in the underlying socio-economic conditions and their differences. As a result different groups get different incentives arising from the political economy of those regions. Such differences play crucial roles in explaining different policy and development outcomes. For example, a less active civil society may develop very different political dynamics from a polity with strong middle class activism.

Some scholars see the role of interest groups in developing countries similar to their role in developed countries and advocate for the same tools of analysis to be relevant. But the mechanism through which these vulnerable groups communicate with the ruling dispensation vary widely from the developed countries' experiences. For example, in our model the land losers evicted for a development project along with the civil society activists protest against the Government. Here protest is the mechanism which acts as an avenue of communication between the civil society and political rulers. So even if we use the same analytical tools, different frameworks may often emerge to fit the experiences better. This communication and protests may sometimes vary from extra-institutional to violent conflict as well, but that's a digression from our basic argument which we stay away from. We study conflict in the form of political violence in another separate context- clientelism and strategic voting.

The second chapter of my thesis deals with political violence, which is another major tool used by the political rulers and different groups in L.D.C.s. This violence is embedded in the daily politics of even in democracies where the democratic institutions are extremely weak and perform in a toothless manner (Bates, 1981). This is complemented and aggravated by weakness of legal institutions. As a consequence, political instability of power is also prevalent with intermittent dictatorial regimes (Jackson and Rosberg (1984a)

and Sandbrook (1985)). All of these phenomena make the politics of poor countries markedly different from the politics of established democracies. Attempts have been recently made to bridge this gap in studying such different experiences. For example, application of current models of political competition in studying coups and fragile democracies have seen notable contribution from the work of Acemoglu and Robinson (2005). Our framework deals with a newer and complicated phenomenon in this direction, modelling the complex relationship of corruption, political violence and clientelism.

Our earlier discussion on the protest model focussed on how qualitatively different models are needed to study policy choices and reallocation of resources for economic development, by facing hurdles from different socio-economic groups and their contradictions. In continuation with the feature of this class antagonism, we now move on to emphasize on the means and forms of these exchanges granting favours between the political leaders and the different interest groups or classes in the L.D.C.s which happen to be quite different in general from the developed countries. This acts as the link between the first and the second chapter. Clientelism is one such form of exchange, and corruption and violence play complementary roles to sustain it. We elaborate on this complex issue one by one.

It is well known that clientelism is a defining characteristic of the political economy of less developed countries. Numerous examples in Asia and Africa support this claim. Clientelism is based on the extensive use of state resources for political purposes, stretching in an endless series of exchanges ranging from village level to the highest reaches of the central state. The use of government resources directed at key players to "buy" their support is a common theme of politics. (See also Reno [1999].), Bates (1981)). Using 'pork barrel' spending to attract voters in national or municipal elections in developed countries like in the U.S. has been sufficiently studied in the literature (see Dixit et al for details). In essence, clientelism is quite different from a situation where a leader appropriates public resources in order to transfer them to a small group of key political players or selectorate.

Corruption is another defining feature of L.D.C.s, which is broadly relatable to clientelism. It helps to sustain it through the weaknesses of the legal institutions of the L.D.C.s. It's also one of the major forms of exchange of elite capture of economic and political institutions. Two important questions are relevant for our analysis here. First, why is corruption so high in developing countries than the developed ones? The second question follows automatically- does the current political economy literature sufficiently ex-

plain this gap? The elaborate answer to the first question has been offered by various explanations in the literature of economics. The answer to the second question lies in a new qualitative approach which motivates our work in the present thesis. We add another dimension to it - political violence, which is a direct consequence of the politics within a clientelist framework in presence of weak legal institutions.

In particular, we identify large informal sector and high political violence as two defining features of less developed economies. We establish a causal link between the two focus on two possible channels through which, in the broader perspective of our thesis, economic backwardness can affect the quality of democracy. We illustrate how contagious voting behaviour of the informal sector affects political violence and explain the persistence of political violence within a democratic framework. The class antagonism is captured through the difference in the preferences of the formal sector voters from the informal sector voters. We find a growing informal sector and clientelism to be detrimental for the development iof poor countries. We also explain the puzzle of why well-performing incumbents engage in violence, even in democ

Both these models of collective action in our first two chapters have important implications for the economic development of L.D.Cs. Development failures can be attributed to distortions in the use of resources by clientelism, much like special interest politics. They both are interrelated. Clientelism creates the opportunity through which elite capture can step in, which has several implications. As a result, processes of economic reforms have seen increasing manipulations for political advantage. Firstly, extensive use of state machinery for deliveries and political gains result in highly interventionist economic policies. Secondly, on micro- level, this serves as an impediment for development and proper functioning of small and medium markets. Market reforms never become a priority for these governments. Thus it is clear that policy distortions in a strongly clientelist system are far larger than those arising from pork barrel politics in an established democracy. Through the behavioral feature of collection action, these distortions form the qualitative link that inter-relates the question of development in these two different contexts and settings of the first two chapters.

This feature in our second chapter exhibits a separate class of selectorate of clientelist voters and their effect on economic and political institutions. It clearly establishes that the characteristics and quality of functioning of the institutions in developing countries are much different from the developed ones

and often quite poor. This substantiates the need for a separate literature of these issues for developing countries, which is the primary contribution of this thesis.

The discussion up to now has focussed on how the objectives of politically elected leaders or the constraints they face in L.D.C.s are different from rich countries which affect the different policy choices they make. In continuation with the above arguments, the reasonable consequence of failure to undertake economic reform is a major relatable consequence. In many developing countries, a key government objective has been to shift their economic base from agriculture to manufacturing and modern sector (Bates (1981)) . In the beginning two of the three chapters of this thesis, under two very different contexts and issues, we have modelled this phenomenon of socio-political hurdles that the Government faces. The third and concluding chapter now specifically studies its attempt of economic reforms via investments under political constraints.

The final chapter deals with a backward economy where the Government tries to switch to a modern sector for economic growth and development through investments. We model the investment decisions as a coordination problem for the investors. The investors are classified as local and foreign investors by their location, behaviour and investment decisions. The coordination feature concerns the foreign investors, and their returns are dependent on other foreign and all local investors. This feature of externalities gives rise to the strategic complementarity in investment decisions resulting in a collective action. We find the local and foreign investors to be substitutes for a poor economy. In the extension of our baseline model, the Government faces an electoral constraint and we compare the results of the benchmark case to see how the political constraint affects investments. The political constraint increases the government's effort for investments when welfare transfers for ensuring votes are costly, but reduces the effort for cheaper transfers. We finally conclude by discussing regional history and poverty traps as a possible consequence of our finding within the existing literature. Studying investment dynamics with democratic constraints comprise the most noble feature of this study.

All our models of collective action follow the structure of a global game with noisy signals. In all the cases the formal tools required for analysis may be the same, and the key focuses of political economy remain on what may be considered acceptable to the electorate and society at large. The real answer lies in the qualitative difference in the experiences of the developed and

developing countries, and it calls for improvising these qualitative changes while developing new models on the political economy of poor countries. In the next chapter we review various strands of literature relating to our approach and framework, and then proceed to present the formal models in the subsequent chapters.

Chapter 2

Review of Literature

Each chapter of this thesis models a distinct situation of collective action and studies its economic implications. We briefly review the literature of collective action in general and global games in particular.

The formal treatment of collective action theory saw massive growth in the past two decades. These studies have collectively grown into acknowledging the fact that the real issue was not whether rational agents can coordinate but rather what circumstances make them coordinate, how they sustain it, what factors affect coordination etc. We have related these issues with the questions of development in this thesis.

The formal approach was built over debates among various strands of literature and the Olsonian framework can be taken as a starting point of the current formal literature of collective action theory. The dominance of the Olsonian framework saw the first departure from Schelling's 'tipping games' (1978), which were better in generating higher levels of coordination among the players in equilibrium. From the technical point of view, Olsonian games had a unique Nash equilibrium, but tipping games generated multiple Nash equilibria. In games with unique equilibria, results are arrived from the preference structures over the payoffs. But in games with multiple equilibria, results are driven by each player's expectation about other players' action, which requires massive levels of coordination. These expectations are determined exogenously, not by the payoffs alone. Thus, Olsonian equilibrium had become one particular case of Schelling's approach if only the correct expectations could have been formed through successful coordination among the players. Both Olson and Schelling's approach in the collective choice literature form particular instances of a common framework of rational choice

theory, each with its own scope and constraints.

The Olsonian framework believed that selective incentives are solutions to collective action problems, with large teams more prone to free riding than small groups. But Esteban and Ray (2001) has argued that the Olsonian conjecture which claimed large groups are at disadvantage with respect to the smaller groups ignores the fact that players of a larger group have lower per capita marginal cost of participation. A large body of empirical work (Hansen et al. 2005) has found that in real life more collective action is observed than predicted by the original theory of the Olsonian framework.

Another strand of literature in collective action theory has attempted to make the formal models more realistic by going beyond the standard assumption of rationality. The works on this front have gone in different directions and cannot be summarised by any single framework. Three major approaches can be broadly identified. One has changed the behavioral rule of individual decision making by borrowing from theories of cognitive psychology; another went into a completely opposite direction by considering the ethical motivation of individuals in considering their decision on whether to participate in a collective action game or not; the other borrowed from sociological theory to explicitly model non mechanisms of individual decision making, influenced by their social networks. The beginning chapter of this thesis is composed according to the second approach, modeled in terms of *democratic values*.

Eventually, for the synthesis of these two broad strands, a deeper understanding was needed on how expectations about other players' actions are formed within a strategic framework. In games with multiple equilibria, what conditions lead players to form different expectations, eventually resulting in one of the many possible outcomes becoming a central position question for the researchers in game theory. For this, focus was needed to be put outside the equilibrium of a game structure. This paved the way for the development of a newer kind of literature moving away from the standard rational choice framework. As a result, a bunch of behavioral and network models developed which offered rigorous theoretical explanations of individual decision making from non-Nash equilibria. Most of them often converged to Nash equilibria. These two approaches, one stemming from rationality assumption and the other beyond it, complimented each other in offering a holistic view of mutual mechanism between the factors driving towards a steady state and the characteristics identifying each of the states. Our approach in this thesis falls in the former category of complete rationality assumption.

In a game, scope of collective action arises when players recognize the

benefits of coordination and converge towards an equilibrium based on high participation. Eventually, participation games formed the basis of much of collective action theory. Even though these games didn't offer any new result, they served as the framework for locating new results obtained in the more sophisticated models of multiple equilibria frameworks. In general, in a participation game the payoff from any strategy for a player depends on the strategic choices of the other players, giving rise to the feature of strategic complementarity. Along with the formal literature in collective action, similar developments ensued in the voting literature too. The mechanism of the models in this thesis are appropriate for such a framework. The three particular collective actions we focus on in this thesis are viz. protest, voting and investments, which are major examples of participation games.

Conceptually, participation games with multiple equilibria are similar to economic models of decentralized production subject to economies of scale. At low levels of participation, agents face the equivalent to increasing returns from the action they engage into. Whenever an agent participates in a group activity, she lowers the cost faced by others, thereby encouraging them to participate, as a result lowering the cost for others to join. Low levels of participation, including free riding, may be an equilibrium, but if the players find themselves in a situation with increasing returns, their decision to participate "crowd in" more participants until a new, higher level of participation arrives. This feature is the central thread of this thesis.

Pertaining to my thesis, I will keep the focus on coordination games. A look at the history of formal literature of collective action games may be worthwhile. Chwe (2001) has discussed the recent developments of collective action models in the game-theoretic literature. Each chapter of this thesis finds the agents in a coordination game in three different contexts and settings. Coordination games with multiple equilibria has seen many applications in public good games in modelling institutions that incentivise cooperation among the players. In general, voluntary groups were found to co-ordinate better than expected whereas organised groups are prone to free riding. Our first chapter deals with motivated voluntary groups. Lowery et al. (2004) empirically found the gap between the coordination by voluntary and organised groups to be smaller than expected. This necessitated improvements in the prediction accuracies of the pre-existing theoretical models. Apesteguia and Maier-Rigaud (2006) attempted to bridge this gap by studying the differences between public goods and common pool resources

games, where coordination games also saw many applications.[1]

The theory of collective action has also met inspirations from social network analysis. Networks propagate participatory behavior. As behavioral models took much from the theory of cognitive psychology, network models were founded on the basic assumption that decisions are influenced by social relations. The objective of the network approach is to establish how the participation rates respond to underlying sociologically information.[2]

In game theory, all agents are assumed to be fully rational, taking into account all the information around them. On the contrary, network analysis begins with the assumption that agents face widely different environments depending on their location in the societal structure, each having access only to the information generated by the neighborhood. In the literature of network theory, external-motivations are derived from social norms, as in Gould 1993 etc. For example, Siegel (2009) assumes a linear causal relationship between external motivation and participation. This linearity assumption generates a unique equilibrium of participation, which is a norm rather than an exception in participation games. Multiplicity of equilibria arises from the nonlinearity of the production functions. Siegel 2009 has made up for this limitation by incorporating different levels of participation obtained from the different equilibrium levels. In game-theoretic models, multiple equilibria is generated by the same distribution of internal motivations, whereas in the network models, each equilibria is generated by changing the underlying

[1]Unlike the public goods games, in common pool resources games an individual's appropriation reduces the availability for other players, which drives different results from the public goods games. Apesteguia and Maier-Rigaud (2006) experimentally verified that players are aware of these differences and choose their strategies accordingly while playing these two different games. Other experimental work has shown that status motivations (Willer 2009), or establishment of leadership within a group (Levati et al. 2007), can enhance cooperation in public-goods settings.

[2]According to the network theory, individuals with high propensity to participate exert significant influence over others with whom they have strong social ties. But as most agents are connected through strong ties only to a small fraction of the population, such influence may not go very far, or at most propagate very slowly. On the other hand, weak ties imply that although the original influence of an agent may not be strong, it will spread widely because of weak ties linking large numbers of individuals. This issue of "strength of weak ties" (Granovetter 1973) has consistently been at focus in the network theory of collective action. Empirical evidence (Lim 2008, Huckfeldt Sprague 1995) confirm that an agent is more influenced by distant agents with mutual interests than by closer ties where such affinity does not exist. As an interesting example, Siegel (2011) applied network analysis to study repression as a mechanism to stall collective action.

distribution of the internal motivations.

Over time, game theory adopted ideas from networks giving rise to network games (one can refer to Ballester et al. (2006) for a broader discussion), which saw varied applications from adoption to new products (Jackson Yariv 2007) to coordination in models of revolution (Chwe 2000). Presently, network structures have been successfully modelled as endogenous in the game theory literature (e.g., Bala Goyal 2000).

The game-theoretic approach can provide an easy view of the entire picture of social interactions and its multiple solutions, but network models require many more steps, much of which depend on the choice of parameters and assumptions. But this simplicity of game theory has a cost. Technically, behavioral and network models both focus on how players behave outside an equilibrium which leads the system to their participation in the collective action. This left ample space for an idea of looking beyond the existence of full conditions of an equilibrium to develop.

The stability of equilibrium selection was first taken up rigorously by Harsanyi Selten (1988). Their characterization of stability sets was used to generate a probability distribution over the different equilibria in a collective action game (Medina 2007). This was particularly helpful for participation games with multiple equilibria. Instead of reporting all the equilibria all of which are not informative, a probability distribution is more informative which also responds to changes in the exogenous parameters.

Additionally, Crawford et al. (2008) illustrated the power of focal points in easily erasing the asymmetries in players' payoffs and also applied the coordination phenomena in other studies of game theory, especially the "k-level reasoning." This was a prominent departure from the common knowledge of rationality (Nagel 1995, Stahl and Wilson1995). [3]

Another possible explanation provided by the quantal-response equilibrium (QRE), introduced by McKelvey and Palfrey (1995) had the objective to develop a game-theoretic model which allowed the players to make mistakes about their perceptions of other players. This realistic approach saw much applications in the study of participation games including voting, volunteering, and informational cascades (Goeree Holt 2005, Goeree et al. 2007, Levine Palfrey 2007). In a survey paper Myatt and Wallace (2008) explained

[3]Broadly, as Sugden (1995) and Richards have shown, the knowledge-induced equilibrium is relatable to focal points (Schelling 1978) too. Experimental evidences have confirmed that such models which allow for bounded rationality perform better than orthodox game-theoretic models.

how Q.R.E. can generate necessary perturbations in an evolutionary model of collective action.[4]

In our context, collective action and coordination games have seen significant applications in formal political economy models. Our first chapter captures the collective action behaviour by civil society in the form of a protest. A conventional collective action game often used to represent protests or social movements was offered by Wood (2002). There, some citizens exhibit an intrinsic motivation for an action - particularly for restoring democratic justice. This understanding and participation in a civic duty stems from deep rooted democratic values in the society. A directly similar work in the literature is scarce but some work on civic and democratic duty and motivation behind them are worth mentioning.

The classic paper on the role of civic duty was by Riker Ordeshook (1968). Most of those approaches to construct voting models with high turnout and costly voting departed from the standard game-theoretic model by changing the payoffs to accommodate expressive benefits (Schuessler 2007), altering the incentive structure (e.g., Morton 1991), computation of probabilities (Kanazawa 1998) etc. Experimental evidence suggested that in real life civic duty plays a role in mobilizing citizens via social pressure and altruism (Fowler 2006b, Gerber et al. 2008). One classical approach by Riker-Ordeshook kept civic duty as an exogenous variable. Later, Fedderson et al. endogenize it (Feddersen and Sandroni 2006, Feddersen et al. 2009). The main departure was in some players of the game deriving additional utility from an ethical rule that maximizes normative social welfare.[5]

In the search of explaining motivations driving participation in collective action outside of an equilibrium, one strand of literature that explored beyond

[4]Also, Harsanyi and Selten (1988) proposed the tracing procedure as another method for equilibrium selection by relaxing the assumption of common knowledge. This is similar to k-level reasoning, with players choosing their strategies by some arbitrary exogenous rule. The tracing procedure had two significant uses, but left unanswered the question of sources' of a player's behaviour.

[5]This corroborates with the idea of "team reasoning" in game theory (Bacharach 2006) and its experimental evidence (Mehta et al. 1994). Such behaviour, where players' deviations are collective unlike the standard Nash equilibrium approach, can be seen in coalitional strategies too (Aumann 1959, Bernheim et al. 1987, etc) and recently being applied to large voting games (Ambrus 2006). Many extensions have been attempted to capture more realistic aspects of decision making. For example, Morton (1991) suggested that elites can affect turnout in voting by offering incentives to groups of voters., whereas Feddersen and Sandroni (2006) studied a model with ethical players.

rationality assumption incorporated notions of bounded rationality. Finkel et al. (1989) and Finkel and Muller (1998) extended the Olsonian model of collective action by allowing players to estimate the relative efficiency of their individual contribution.[6] But The models were largely successful in replicating realistic patterns of participation in games. We in our model have not delved into explicit details of motivation.

The second chapter of this thesis studies an application of coordination for collective action through *strategic voting*. Similar mechanism of participation games discussed above occurs in voting too. With the idea of voting itself as a participation, participation games had seen applications in strategic voting too. In earlier strategic models of voting, Palfrey Rosenthal (1983) had proved how a voting game with fully rational voters could generate multiple equilibria, even with high levels of voter turnout.[7] Following this strand, Castanheira (2003) had studied a version of participation game, building on the results of Myerson (1998), where the number of players to follow a Poisson process. The behavioral approach made additional contributions to allied literature of voting.[8]

Our final chapter models investments as a collective action. In such contexts of incomplete information in markets, collective action by businesses can play a positive role in providing the knowledge that markets often are not able to provide. Peng (2001) has argued how coordination by business associations in a number of transition economies has made important contri-

[6]In a long tradition of micro foundations of such behavioral departures with bounded rationality Lubell Scholz (2001) developed a model of cooperation with a repeated Prisoners' Dilemma game; a body of work on general model of elections from Bendor et al. (2003) to Bendor et al. (2011), taking cues from cognitive psychology with the context of coordination games. They incorporated "aspiration levels" and "propensities" as the benchmark to evaluate new choices, which were traditionally not part of the canonical form of game, and the solution concepts remained different from customary game theory.

[7]Two years later, they restated their result (Palfrey and Rosenthal 1985), clarifying that the high-turnout equilibria found before couldn't hold when the model was extended to introduce imperfect information. Medina (2011) later revised this model to show that high-turnout equilibria may reappear even with imperfect information with much more robustness.

[8]For example, Bendor, Diermeier Ting (BDT) established how turnout in new democracies starts at a high level and may decline gradually. Recent evidence from new democracies of the Middle East support these results. Fowler (2006c) proposes an alternative learning mechanism that retains many of the predictions of BDT, like high levels of turnout, but also predicts habitual voting, that is, voting in one election increases the probability of voting thereafter. Experiments by (Gerber et al. 2003) supported their result.

butions to wealth creation in those countries. A growing literature looking at China has also identified collective action by both state-owned and private businesses as playing an important role in enhancing the investment climate (Kennedy 2005; Zhang 2007; Deng and Kennedy 2010). In reality many business associations can be found to provide their members information and access to new opportunities for investments. They basically act like tools of coordination. Such efficient networks with non-market stakeholders help especially the foreign firms to obtain relevant information, accelerate investment decisions, reduce political risks (Peng 2001; Ho ltbruegge and Puck 2009, Batjargal 2007; Heikkila and Salmi 2015).

All our models in this thesis are set up in environments of imperfect information. A game of Collective action requires some basic knowledge on behalf of the players as a precondition. The common knowledge of rationality is a sufficient condition for equilibrium in such games of collective action. Lohmann (1994) and Kuran (1991) began the work on "informational cascades" to study how players involved in a collective action approach a common knowledge of their payoffs and strategies. Recently, Bueno deMesquita (2010) applied such models for a formal treatment of revolutionary mobilization.

From the above review of the literature of collective action, it's evident that mass collective action has been a straightforward consequence of game-theoretic models of social coordination. The focus of present research is not stuck to explaining high levels of participation, but has shifted to explaining how the participation rates respond to changes in the surrounding environment. Multiplicity of equilibria has led to exploring nonstrategic interactions to understand what makes sustained coordination possible. Multiple approaches grew out of this need which we have briefly discussed above for an overview to understand the underlying objective.

We conclude the discussion in this section with one particular aspect of collective action which is relatable to our thesis- the *herd behaviour*. Contagious behaviour in mass collective action is the common thread of the models presented in this thesis and technically we have used Global Games for the formal treatment of modelling collective action. Most situations of collective action call for a determining role of players' uncertainty about other players' actions. As other players' actions are motivated by their beliefs, every decision maker must consider the beliefs held by other players. Harsanyi (1967-8) was among the significant first to argue that rational behavior in such environments depends not only on economic agents' beliefs about under-

lying economic situations, but also on higher order beliefs of- that is, players' beliefs about other players' beliefs and so on. This helped Mertens and Zamir (1985) to completely describe the "type" of a player in an incomplete information game in terms of a full hierarchy of beliefs at all levels. Such studies paved the way for identifying strategic environments with incomplete information which could capture the role of higher order beliefs in economic environments.

With this objective, Global games were first studied by Carlsson and van Damme (1993a). In a global game setting, uncertain economic fundamentals are summarized by a state and each player observes a signal about that state with some noise. Assuming the noise to be common knowledge among players, each player's signal generates beliefs about the true state, beliefs about other players' beliefs about the state, and so on. The advantage of global games is in arriving at a unique equilibrium where each player chooses the action that is the best response to a uniform belief over the proportion of other players choosing that action. When a player faces with a signal about the state of the world, her task is to predict the proportion of other players who will opt for a particular action. She assumes it as a random variable to be uniformly distributed over the unit interval and chooses the best action under her perceived belief about her surrounding environment. These beliefs are named after Laplace's (1824) as he was the first to suggest applying a uniform prior to events unknown. It also clearly resonates with Harsanyi's view that players should derive rational beliefs about other players' behavior in settings of incomplete information. One apparent weakness in the formal models of collective action is that, one set of beliefs motivates actions which bring about outcomes driven by those beliefs, and another set of self-fulfilling beliefs lead to different outcomes altogether. Morris and Shin (2000) have argued that this apparent indeterminacy of beliefs in models with multiple equilibria are rooted in two simplifying assumptions in the theory. Firstly, the economic fundamentals are assumed to be common knowledge; and secondly, the economic agents are assumed to be certain about others' behavior in the equilibrium. This results in agents' actions and beliefs to be coordinated in the manner leading to multiplicity of equilibria. The main advantage of Global Games is to overcome this major hurdle of multiple equilibria with the help of the assumption of noise in the signals. With Laplacian assumption, global games allow modelers to filter the set of self-fulfilling beliefs that will prevail in equilibrium. This is a prime reason behind our choice to take up Global Game for the formal treatments of collective action. Additionally,

Global games allow to mark the differences between whether there can be inefficient equilibrium outcomes and whether there is a unique outcome in equilibrium.

Global games have significant practical implications too. They help us to study importance of public information in contexts with coordination among the agents, in financial markets for example, where the nature of public information plays a crucial role than private information. These will be evident in the subsequent chapters of our thesis too. Global games can also be seen as a particular cases of equilibrium selection though perturbations.

Applications of global games have been wide. Some famous of them have been models of pricing debt (Morris and Shin (1999b)), currency crises (Morris and Shin (1998)) and bank runs (Goldstein and Pauzner (2000a)). Extension of currency attacks models were worked upon by Corsetti, Dasgupta, Morris and Shin (2000), Chan and Chiu (2000), Goldstein and Pauzner (2000b), Heinemann and Illing (2000), Hellwig (2000), Marx (2000), Metz (2000) and Morris and Shin (1999a) etc. In the classic model of bank runs by Goldstein and Pauzner (2000a), an extension by adding noise was offered by Diamond and Dybvig (1983). A later body of work on various extensions include Boonprakaikawe and Ghosal (2000), Dasgupta (2000b), Goldstein (2000) and Rochet and Vives (2000) among others. Frankel, Morris and Pauzner (2000) examined global games with many players, asymmetric pay-offs and many actions, and their limit uniqueness result was a generalization of Carlsson and van Damme (1993a).

The models of collective action in this thesis also share the feature of herding or group behaviour. Hence it's imperative to understand the relationship between modeling approaches in the literature of herding vis a vis our approach using global games. In the early models of herding, like Banerjee (1992) and Bikhchandani, Hirshleifer and Welch (1992), players sequentially used to make a discrete choice. The players didn't care about each other's actions directly, but had private information, with which each could learn the information about who chose a particular action before her. In these models, when some early moving players observed signals favoring one action, late moving players ignored their own private information, leading to inefficient herding because of the negative informational externality. The similarity between global games and herding models are that both outcomes are sensitive to the underlying information structure but the mechanisms are completely different. Strategic complementarities in pay-offs and signals generated by noise in purely static settings together drive the results in global

games. Where as, herding games have no payoff complementarities and the equilibrium is generated by sequential Choice. In a simple model of Dasgupta (2000a), All equilibria in this model are switching equilibria, where each player invests only if all her previous players invested and her private signal exceeded some threshold simultaneously. The previous players' decisions of investing convey positive information to later players, making it more probable for them to invest, thereby generating herd behaviour. An increase in a player's signal makes her investment more probable as it makes her think of the situation more conducive for investment. This in turn sends high signals to the following players and this mechanism encompasses higher order belief effects. A body of similar work combining payoff complementarities and herding were taken up later by Chari and Kehoe (2000), Corsetti, Dasgupta, Morris and Shin (2000), Jeitshcko and Taylor (2001) and Marx (2000) among others..

The premise of Global games rests on the assumption that the information received by the players are helpful, but not as accurate to be taken as common knowledge of the underlying state of nature. This inaccuracy stems up from the noise technology, which fixes the hindrance of multiple equilibria too. Summarily, Global games follow the tradition of Harsanyi in the typology of incomplete information games and go miles ahead in rigorously modelling contagious behaviour in collective action with the advantage of non-multiplicity in equilibrium selection. We present our models in the subsequent chapters.

Chapter 3

Land, Protest and Civil Society

[1]

3.1 Introduction

Land acquisition and protests has been one of the most contending issues in history of the modern economic development. Anti-land acquisition protests creating obstacles in capital investments have become a major concern in the process of economic development all over the world. Such risks are more for less industrialized economies where large populations of the labor force are dependent on agriculture, and most of them are unskilled to migrate to the modern sector in absence of land. Both foreign and domestic investments getting stuck due to agitations against land acquisition has been a perennial roadblock to the modernization of developing economies.

The reasons behind spontaneous resistance by locals against forceful acquisition worldwide varied widely from inadequate compensation to loss of common ownership to ecological concerns. Major triggers included high economic and agricultural productivity of the land and threats to food security, to mention a few. Many disputes also link to the alleged environmental im-

[1]The authors would like to thank Prof. Kaushik Basu, Sugata Marjit, Bibhash Saha, Parikshit Ghosh, Anirban Kar, Amrita Dhillon, Sattwik Snatra, Souvik Dutta, Sabyasachi Das, Chandril Bhattacharya and all the seminar participants at Indian Statistical Institute, Kolkata, 2017, National Conference of CTRPFP at Centre for Studies in Social Sciences Calcutta, 2018, Development Economics Conference 2019 at Lincoln, UK and 2nd Delhi Political Economy Workshop, 2020 at Indian Statistical Institute, Delhi for their valuable comments.

pacts of the proposed projects. A rise in such protests, especially in the post-Globalization period, has been pointed in addition by some scholars as signals of rising economic inequalities.

In case of forceful land acquisition and eviction, protests were the only form of dialogue and advocacy left with the dissenters. Most of the anti-acquisition protests were aimed at dislodging the projects, and the protests often ended with a higher compensation resulting from a stronger bargaining through the protests. Forceful acquisition also aroused political rage across the society for denial of civil and democratic rights of the evicted land owners.

Anti-acquisition protests have gradually shaped public opinion of the society in favor of the *displaced* and brought their plight of welfare into the arena of public debate. Through public deliberation, their representations via protests were transformed into discourses which built public opinion and eventually led to policy changes (Habermas 1996). The post globalization era especially saw newer kinds of movements against forceful eviction with broader participation from different stratum of the society.

Across the world, such resistance often originated locally with some distinct nature, and spread spirally with varied intensity, making a permanent mark on the socio-political narrative of the society. Such resistances gave rise to newer kinds of protest movements, new debates and policy changes, bringing the issue of democratic rights back into the focus of economic policy, often reshaping the core ideas of justice. From these anti- land acquisition protest movements, a prominent underlying pattern emerged with time- the *spontaneous* participation of *civil society*. This forms the main paradigm of our paper.

The civil society's support to land-losers, who were mostly poor and came from the marginalized sections of society, not only gave a new character to the protests, but also largely contributed to the quality of democratic politics. From late 1970s, civil society mobilizations had begun to galvanize around the struggle for protection of civil liberties and environment, against the large development projects that had displaced thousands of tribal peoples and hill dwellers (Shah 2004; Parajuli 2001; Katzenstein, Kothari, and Mehta 2001). Since the 1980s, many of the new social movements became focused on single issues, and land acquisition was one prominent among them. (Kitschelt, 2004). Civil society today has eventually come to be identified as an alternative source of struggle and solidarity.[2] Social activism at the

[2]As another example, the development of struggles against Soviet imperialism in Cen-

grassroots prompted some scholars to acclaim these arenas of civil activism as a "non-party political" alternative to the state (Sheth 1983; Kothari 1988, 1989).

Spontaneous participation of civil society in protests against forceful land acquisition is the backbone of our paper. Our main purpose is to offer a theoretical model of anti-land acquisition protests and its' effect on economic development. To the best of our knowledge, such an attempt with the question of land acquisition was so far inexistent in the formal economic theory.

The origin of forceful land acquisition goes back to the beginning of 17th century, which is known as the Enclosure movement in Britain's history. In that episode of history, 2.76 per cent of the total land was enclosed and 50,000 persons were forcefully evicted along with the expansion of trade (Sarkar, 2010). Later in United States during 1870-1910, vast areas of land were acquired by the federal governments through various state legislations to subsidize private enterprises in Railway construction, milling and mining etc. With gradual progress of time, land acquisition became synonymous with protests against forceful eviction and displacement. According to the World Commission on Dams Report (2000), in Brazil, Argentina, Mexico, Panama, Colombia along with other places of the American continent, as well as in Indonesia, Malaysia, Thailand, Pakistan, Bangladesh and other Asian countries saw protests and displacement of thousands of people for building dams alone.

In later years, less developed countries (L.D.C.s) especially faced protests in their attempts of industrialization for economic development. From Latin America[3] to Africa[4], huge capital investments faced such hurdles. This hurdle did not remain confined to developing economies only. Many developed countries including UK and US faced similar experiences in the face of large acquisitions and had to repeatedly amend land acquisition laws to tackle this problem, but only with limited effect.

All along history till the present times, almost all countries have possessed

tral and Eastern Europe led scholars to label its protesting role as a "parallel polis" (Benda 1978), by which government hegemony could partly be neutralized.

[3]In Brazil's Rio de Janeiro for example, during 2011, protests against the acquisition of farmland delayed one of its most promising industrial projects, CISPA worth USD 40 billion

[4]During 2009 in Kenya, communal protests had erupted against acquisition of 50,000 hectare of farmland for developing a bio-fuel plantation and manufacturing hub by an Italian company, which finally scrapped the project

and exercised legal powers[5]from time to time to take over private property for public use, usually for development projects like industrialization, dam construction etc. The law giving such acquisition power is known by different names[6] in different countries, like *Eminent Domain* in US, Philadelphia, *Compulsory Purchase* in United Kingdom, New Zealand and *Land Acquisition* in India, Malaysia, Singapore etc.[7]

In recent past, this issue regained salience in the aftermath of globalization, especially when the two fastest growing economies, China and India, saw waves of protests against land acquisition by the state for private entities. Protests against land acquisition for large Special Economic Zones gained attention worldwide and led to major policy debates. Both violent and non-violent movements against massive displacement stalled huge foreign and domestic capital investments by private investors in these countries. In India, till 2016, out of 80 high-value projects of investment value INR 10 billion or higher[8], more than a quarter (21 projects) were stalled due to land disputes and protests.[9] The total investment at risk in these 21 projects was estimated to be INR 1,926.2 billion.[10].

But these are not only a post globalization phenomenon in these developing countries. In China, according to World Commission on Dams, long since 1950s, 10 million people have been displaced due to hydraulic and hydroelectric projects alone (Jing, 2000). A statement by China's Ministry of Public Security acknowledged that 87,000 public order disturbances broke out in 2005 alone, a large chunk of which is due to land grabs. Between 1992 and 2005, estimates (Goswami, 2007) suggest twenty million farmers were evicted from agriculture due to land acquisition and more than 21 percent of arable land of China was acquired and put to non-agricultural use.

[5]in many cases, the power been given to a provincial government

[6]We will generally refer to them as the 'land acquisition law' in this paper.

[7]Other names include *resumption* (Hong Kong, Uganda), *resumption/compulsory acquisition* (Australia), or *expropriation* (France, Italy, Mexico, South Africa, Canada, Brazil, Portugal, Spain, Chile, Denmark, Norway, Sweden, Finland, Germany, Panama) etc.

[8]announced after 1st Jan 2008

[9]This report of Bharti Institute of Public Policy-Indian School of Business is based on data by CMIE. According to an earlier survey by CMIE in 2011-12, land acquisition problems accounted for 30 per cent of the problems behind stalled investments in India

[10]Fourteen of the 21 stalled projects themselves claimed acquisition of private land as the root of dispute. Out of these 21, 12 involved public land, 10 involved only private lands, and four involved both private and common lands

For example, the history of post-independence India wasn't different too. The World Commission on Dams reports that 4.5 million hectare of forest land has been submerged by dam construction in India between 1980 and 2000. On average each dam construction has displaced more than thirty one thousand people.[11] As per the National Policy for Rehabilitation report, around 75 percent of the displaced people since 1951 are still awaiting rehabilitation in India.

As China and India, the two fastest growing economies of the developing world, adhere to two opposite political systems, a comparison of their experiences with vast land acquisitions is our primary motivation. Different political systems shape different incentives for their rulers. Protest-activism against forceful displacement has longer effects on the quality of democratic practice of a country. The question of democracy follows naturally with the issue of anti-land acquisition protests. As evident from the discussion before, protests in a democracy have the potential power to stall major projects, which has serious implications for a country's economic development. As democracy is a natural ingredient of our model, hence India, the world's largest democracy, emerges as a typical example of a L.D.C to have faced such hurdles in their path of development. These features collectively offer the experiences in India as a representative case to study our model. We discuss in details some motivating evidence from India in the subsection below.

3.1.1 Motivating Case Studies from India

Some benchmark cases from India are worth discussing which help to understand the typical scenario we have tried to model.

In India, 1947 onward after independence, land acquisition became crucial to several large public projects like construction of dams, expansion of roads and railways, building factories under public ownership etc. One of the longest and classic movement by civil society was the Narmada Bachao Andolan (NBA). The Narmada Water Disputes Tribunal in 1979 decided to build 30 major, 135 medium, and 3000 small dams, assuming to provide water to around forty million people, irrigation, and electricity to people in

[11] As per the Tenth Five Year Plan in India, mining displaced 2.5 million of which 52.2 percent were tribals; forest conservation displaced 0.6 million of which 75 percent were tribals; industry displaced 1.25 million of which 25 percent were tribals; and infrastructure building including road, bridges and airport construction displaced half a million of which 25 percent were tribals.

the region. The dams by 1985 displaced 11 million Indians. When peaceful protests erupted, mainly in Gandhian form, many groups of activists such as Gujarat-based Narmada Asargrastha Samiti, Madhya Pradesh-based Narmada Ghati Nav Nirman Samiti (Committee for a New Life in the Narmada Valley) and Maharashtra-Based Narmada Dharangrastha Samiti (Committee for Narmada Dam-Affected People) joined the movement.[12] The World Bank, who had sanctioned loan for the project, formed the Morse Commission in 1991 which reported that the Bank's policies on environment and resettlement had been violated. The Indian Government canceled the World Bank's participation in 1993. The Sardar Sarovar Dam's construction began again in 1999 and was declared finished in 2006.

Another illustrative example of our model is Singur and Nandigram in West Bengal of India. The Singur-Nandigram anti-land acquisition movement started a new civil society movement which gained widespread support from the urban and intellectual class.

India passed the Special Economic Zone Act, 2005 which came into force in February 2006. An SEZ is a geographic region within a nation-state in which distinct laws provide arrangements to facilitate capital investment and employment. The following decade saw most of the protests centering around SEZs around most of which local protest groups arose in resistance. Protests against land-acquisition didn't weaken or die soon as predicted by many, and the ruling dispensation came under pressure to respond to the coercive role of state in acquiring land. The protests shifted from the domain of social activism to partisan politics where removal of SEZ policy added impetus for the opposition. The 2007 federal elections in Punjab to 2011 legislative elections in West Bengal revolved around this issue, where a historic rule of uninterrupted 34 years by a democratically elected Communist government ended over accusation of forceful land acquisition for industrialization. On many occasions, the politicization of the land-acquisition protests took intra-party dimensions as well. In response to such 'implementation problems' and consequent persistent protests, policy prescriptions regarding compensation consisting of both monetary and non monetary components like job, housing, healthcare, education etc came into the forefront. The states like Haryana, Maharashtra, Orissa, and West Bengal where some of the most visible and sustained protests took place were compelled to take a fresh look at their

[12]The leading spokespersons of NBA, Medha Patkar and Baba Amte, received the Right Livelihood Award in 1991.

SEZ policies. With extreme politicization of this issue, the Government under pressure amended the Land Acquisition Act in 2010 reforming the compensation policy.

From 2006, Singur gained media attention since Tata Motors started constructing a factory to manufacture arguably the world's cheapest car, Tata Nano which was estimated to cost USD 2,500.[13] The state government of West Bengal created controversy by implementing the 1894 Land Acquisition Act from the pre-independence period of British for takeover of 997 acres of fertile farmland for the factory. The widespread resistance from land losing farmers and agricultural laborers, civil and human rights groups, legal bodies and social activists etc. was organized around the Krishi Jomi Bachao Committee (Committee to Save Farmland) formed in 2006, which was a rainbow coalition consisting of various groups like the Bhumi Uchchhed Protirodh Committee (Committee Against Forced Displacement from Land), Krishi Jami Raksha Committee (Gana Unnayan O Jana Adhikar Sangram Committee etc, and also various political parties including the main opposition party Trinamul Congress (TMC). Ultimately Tata Motors was compelled to announce withdrawal in 2008 due to the political unrest and agitation (see, e.g. Sarkar, 2007, and Ghatak and Banerjee, 2009). Leaders of the anti land acquisition groups got elected from the adjoining areas. In 2016, the Supreme Court quashed the erstwhile West Bengal government's acquisition of 997 acres of agricultural land for Tata Motors and ordered its return to 9,117 landowners. Till date, Singur remains one of the landmark case in the history of anti land acquisition movement in independent India.

In 2007, controversy began when the government of West Bengal decided that a chemical hub would be established in Nandigram by the Salim Group of Indonesia. [14] The agitation, comprising of land losers and citizen activists, was spearheaded by mainly two 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 strengthened the protests (Banerjee et al., 2007). In the aftermath, anti-land acquisition protests led to an emergency in the re-

[13]The total investment planned was of INR 1,000 crore.

[14]The Special Economic Zone (SEZ) policy required the expropriation of 10,000 acres of land owned by farmers in the region.

gion, and 14 people died in a police shooting against the protesters, leaving more than 70 injured. The state government yielded to the popular demands and announced the project's cancellation.[15]

The following series elections in West Bengal were fought mostly on the plank of forceful land acquisition and eviction with Singur-Nandigram as a key issue. Federal elections in 2011 saw the historic defeat of world's longest serving democratically elected Communist government after a stretch of 34 years.

In another state in Odhisha, since 2002 in Niyam Dongar, a rich deposit of bauxite and the proposed site for a large bauxite mine in the Niyamgiri mountain range of India, Vedanta Resources, the multinational company behind this project, has faced considerable opposition from an alliance of local communities, Indian activists and political organizations, as well as international activists and nongovernmental organizations (N.G.O.s) like Action Aid and Survival International. Many of the local Dongria Kondh tribe and their supporters claim that the open-pit mining project would destroy their local environment, contaminate the water supply of the entire area, severely impact their livelihood and culture, and desecrate Niyam Dongar, the mountain they consider the abode of their god.

In 2005, when Posco, the world's fourth-largest steelmaker, signed a memorandum of understanding with the Odisha government to set up a 12-million-tonne-capacity steel project in Jagatsinghpur district, it attracted global media attention for being the biggest foreign direct investment in India, at that point of time, at USD 12 billion (Rs 52,000 crores). The state-owned Industrial Infrastructure Development Corporation acquired 2,700 acres of land for the proposed project and the Posco Pratirodh Sangram Samiti (PPSS) was formed by activists who resisted fiercely. Hundreds of cases were filed against by state police and warrants were issued against more than 1,000 protestors. After twelve years and several twists and turns in the shape of public, the South Korean steel major officially withdrew (Chandra, 2008). The PPSS, still fighting on environmental issues, stands out as a non-party formation that highlighted the nature of development-induced displacement of vulnerable communities in the age of globalization.

Another highly controversial attempt was the Vedanta project, the parental

[15]The electorate of Nandigram reacted against the government's policy and for the first time since the Left Front government came to power 30 years back, the opposition gained control of the local administration (East Midnapore zilla parishad) by winning 35 out of 53 seats in the elections of 2008.

company of Sterlite, seeking to develop an alumunium factory in the Kalahandi districts of Orissa in 2002. Under pressure from opposition by local civil society group, the Save Niyamgiri Group, later joined by others like Green Kalahandi, as well as reputed international organizations, including Amnesty International. [16]

Sterlite Iron and Steel Company had signed a MoU with the state government of Odhisha for a proposed five million tonne per annum steel plant project in 2004, to be set up at a cost of Rs 12,500 crore. Out of the total area to be acquired, 1,805 acres were privately held and more than 90 per cent of the 1,872 acre area came under the category of irrigated farm land. Under protests and public pressure the Odhisha Govt decided to cancel the agreement.

Mudigonda, one of the headquarters in Khammam district of Andhra Pradesh, with huge granite deposits and plenty of granite mills saw violence when in 2007, the communist parties' agitation seeking land for the landless poor took a violent turn with at least eight agitators killed in police firing.

In Srikakulam district of Andhra Pradesh and Ratnagiri district of Maharashtra, local fishermen raised objections of disruption of marine ecology by the thermal power plants. In Odisha, the Aluminum Smelter and Refinery project set up by RSB Metaltech, Lanjigarh Alumina Refinery Expansion Project and a mega auto complex by Amtek Auto Limited and the 2014 allocation of the Deocha-Pachami block (9.7 sq km) for mining in Birbhum, West Bengal faced resistance by tribals for encroaching common forest land. In Karnataka, tussle broke out between the ruling Government and opposition in 2007 on acquiring SEZ land in Nandagudi. In Maharashtra, one of the major sites for SEZ Investment, the Reliance Group's SEZ in Navi Mumbai attracted not only public protest over land acquisition, but objections from various government entities, including the customs and exports commissioner, the revenue department and the Jawaharlal Nehru Port Trust. The proposed 1900 hectare Videocon SEZ on the eastern outskirts of Pune led to repeated protests.

The Bhadradeni Thermal Power project in Telangana was opposed for being built near a wildlife reserve and drawing water from the Godavari River. Protestors demanded to conduct adequate number of studies on the

[16]Interestingly, after sympathy for protesters grew strong, the President of Congress party Rahul Gandhi personally opposing it, in spite of much of the acquisition being carried out by the machinery of Central Government, then ruled by his own Congress party.

ecological consequences of the project before starting production. Other high profile cases include Vedanta's mining activities in the Niyamgiri hills, the Bhadradeni power project in Telangana, and the Srikakulam power project in Andhra Pradesh, all of which started before getting the compulsory environmental clearances.

Major instances of conflict over compensation are Delhi Mumbai Industrial Corridor Project, the Haligudi Steel Project in Karnataka, the Kachchh Cement Plant Project in Gujarat, and the Balpur Thermal Power Project in Chhattisgarh. Instances of such protests and resistance remain plenty: like building a steel plant and also a power project in Khuntia district of Jharkhand (Basu, 2008). Out of 13 projects listed under the Delhi Mumbai Industrial Corridor in CapEx database, only three are under implementation till 2016. POSCO, the multinational steel-making company from South Korea, faced opposition from the farmers of the Haligudi village demanding higher compensation for their fertile land where they grow cotton and eventually had to shelve the project. In eight villages of Telengana, villagers are still resisting acquisition of a INR 80,500 crore project for 50 TMC (thousand million cubic feet) reservoir under the Kaleshwaram irrigation project, that would allegedly submerge their villages. In 2016, villagers began a hunger relay fast which went on more than 600 days.

The consequences of land acquisition in India have been far reaching. Many empirical and theoretical studies on displacement through land acquisition by the government have focused on the immediate adverse consequences of land acquisition. Michael Cernea's 'impoverishment risk model' broadly enumerated eight 'risks' or 'dimensions' of development-induced displacement. These eight risks are very much direct and basic in nature, viz. (i) landlessness, (ii) joblessness, (iii) marginalization, (iv) loss of access to common property resources, (v) increased morbidity and mortality, (vi) food insecurity, (vii) homelessness and (viii) social disarticulation. Later L.K. Mahapatra(1999) added 'loss of education' as another impoverishment risk in situations of displacement. The displacements were from large-scale projects like dams, canals, thermal plants, sanctuaries, industrial facilities, and mining (Pellissery and Dey Biswas 2012). This pertinent feature makes this question even more imperative for economists to take up.

3.1.2 Role of Civil Society

Civil society protests against land acquisition had long-lasting effects on the democratic praxis. Civil society organizations took root to confront violations of democratic rights and to fill in the developmental deficit of the state. Various streams of these movements has been interpreted as a reaction to the retrenchment of the welfare state and to the increasing inequalities. Many developmental projects like acquisition for industrialization under private ownership has been judged to be the characteristic of a non-egalitarian state. Civil society protests gave voice to the evicted land losers, when the political dispensation worldwide used to hold a consensus on the need of forceful land acquisition for development. It provided representation to the evicted, thus forming articulate constituencies (Young 2000). Politics over land acquisition grew over the political opposition coming down in support of the evicted, when protests could draw larger attention.

Their characteristic of being the voice of the repressed, growing organically from the roots became a feature of late-twentieth-century political theory. In its role of empowering the powerless, civil society was also thought to perform the role of organizing citizens for democratic participation (Kelley 2006). The civil society's support to the land-losers, who were mostly poor and came from marginalized sections gave a new character to these protests and the quality of democracy. Their activism serves as a dialogue between the state and the displaced, especially in between elections. Protests are one possible mode of such collective action, especially in between elections. Civil society activism also indicates a return to the politics in the street, giving rise to de-facto political power (Acemoglu et al), but also stressing the difficulties experienced by representative democracy. This significant role of civil society for a democracy makes our study more imperative.

We model the protest behaviour of the civil society and extend it to look at the politicization issue. In our one period static model, the Government acquires land for a project for the development of that region. By law, the government has power to forcefully acquire the land of citizens who are unwilling to give up their land in exchange for compensation. The citizen-activists receive a noisy signal about how many land losers are unwilling. There are two types of activists- ideological and non-ideological. The ideological activists protest against the forceful acquisition whenever the number of unwilling land losers are high enough. The non-ideological activists join in when they believe a sufficiently high number of other protesters will partic-

ipate, as a strong enough protest can stop the forceful land acquisition and cancel the project altogether. Considering together all such possible consequences, the Government optimally chooses the compensation to maximize the chances of the project's success. The strategic participation of non-ideological protesters gives rise to a coordination problem. The noisy signal generates a collective action through the protests which has significant ramifications for the development policies and the quality of democracy. In our partial equilibrium model, compensation for the farmers displaced by acquisition of agricultural land is determined by the political calculations of the Government, while the party in Government behaves in a classical Downsian fashion. We model the coordination problem in collective action with the *Global games* for the advantage with noisy signals which help us to solve multiplicity of equilibira.

In the next section 4.2 we briefly review the relevant literature and present our baseline model in section 3.3. In section 3.4 and 3.5, we extend the model to a broader protest framework and politicization of the issue respectively, finally concluding in 3.6.

3.2 Related Literature

Contribution of our work can be related to various strands of literature, both of economics and political science.

The literature of economic theory on civil society is scarce. In the newly developed economic literature of land acquisition, the role of state in land acquisition has been studied from various perspectives. Besley and Ghatak (2009) gave a number of instances from different points in time where the state had indulged into acts of expropriation. Banerjee et al. (EPW 2007) argued against the inefficiencies of private bargaining, stressing the government's role of mediator as crucial in land acquisition. On the other hand, Sarkar (Oxford, 2010) argued that in a democracy, Government's involvement in land acquisition has political cost, and hence direct acquisition by private investors may be easier. We follow Sarkar's (2010) argument in modelling the objectives and incentives of the Government in an electoral democratic frame work.

A couple of papers have looked into the issues of method of acquisition[17]and adequate compensation (Ghatak and Ghosh (2011), Ghatak and

[17]Ghatak and Ghosh (2011) criticize the new Land Acquisition Law in India and suggest

Mookherjee (JDE 2014) etc.). Ghatak and Mookherjee (JDE 2014) address how farmers displaced by acquisition of agricultural land for the purpose of industrialization ought to be compensated fairly. We don't explicitly model the procedures of land acquisition and put our focus on the effects of anti-acuisition protests on the compensation.

Other theoretical papers have looked into the hold out problem (Roy Chowdhury Sengupta (GEB 2012)[18], Chowdhury (JEBO 2013)[19] Sengupta etc.). We stay away from the hold-up issue in this paper.

Introducing into the literature the feature of politicization of the land acquisition issue, Chowdhury (2013) find that political intervention depends on the political maturity of the landowners. Bhattacharya et al. (2016) discuss how imperfections like bureaucratic corruption and influence of various political parties and civil society organizations reinforce one another and distort property rights. Saha et. al. (2021) further argued that political rivalry distorts land acquisition negotiations between private sellers and a private buyer driven by profits. In that sense, these work fall nearest to our attempt. Our modelling technique of civil society is close to 'concerned citizens' by Besley, Persson (2018) among the most recent work from the economic literature of democracy.

In the political science literature, inspired by new social movements for democracy in the Eastern Europe (Mitzal 2001), studies on civil society and democracy revived in social theory in the 1990s. Recently, the role of protest organizations in global civil society has attracted wide attention (Smith 2006; della Porta 2009a). Analysts of civil society often focus on forms of collective action that give priority to largely consensual issues (Daly 2006; Edwards 2009): for example, pressing public issues that most people recognize as important, like land acquisition in our context. While social movement studies have focused on protest as a dependent variable and the civil society literature has emphasized the role of nonpolitical civil society groups, recent conflicts point to the role of protest as an emergent event in formation of civil society itself. Studies on collective action in Chicago over 30 years revealed that specific events bring people together for a common and specific purpose that are not initiated by political professionals. Political science research

an auction instead.

[18]They concluded that since landowners have incentive to wait until others have already done so, inefficiencies are likely as a result.

[19]They discuss how present-biased landowners, anticipating that they will misuse any income from land-sale, will ask for a very large amount resulting in a longer hold out.

(Quaranta, 2017) shows that in most contexts, younger, male, educated, politically interested, and trade-unionised citizens are more likely to engage in protest activities. Civil society is a sphere of middle class activism and such activism is one of the defining feature of middle class (**??**ohn Harriss (2006)).

In the formal literature of protests, strategic considerations have long been seen as crucial, with an individual's participation shaped by their beliefs about the participation of others. In one strand of protest literature, protests are considered to be a classical form of a political collective action problem, thus producing a game of strategic substitutes (Olson 1965; Tullock 1971; Palfrey and Rosenthal 1984). Another strand of literature assumes strategic complementarity. The reasons include cost of participation being anticipated to be lower in a larger protest, participatory utility being greater in a more successful protest, individual utility post a successful protest revolution being greater for a protest participant etc. (see, for example, Bueno de Mesquita 2010; Edmond 2013; Passarelli and Tabellini 2017; Barberà and Jackson 2018). In a review article, Gehlbach, Sonin, and Svolik (2016) affirm that strategic complementarity "characterizes mass protests". Our approach of modelling protesters' behaviour follows this latter strand of strategic complementarity.

The early models of protests tended to be static (Kuran (1989) etc.), featuring supporters of the opposition falsifying their preferences until the winner was clear. This could be thought of as the protesters' preference to coordinate to be on the winning side. This feature is central in our model which gives rise to a contagious behaviour of the protesters. But the early models do not talk much about how this anticipation affects the protests itself. Also, it doesn't let the government to act strategically in its own self-interest, which we attempt here. In our model, the Government is a pure office seeker behaving in the classical Downsian fashion.

Our protest model follows a threshold based framework with two different types of protesters, much standard in the protest literature. A "threshold" is simply the minimal fraction of the population who must protest before a given agent chooses to protest. Yin (1998) etc. have looked at threshold models of protest turnout with heterogeneous agents in the similar spirit we have followed here.

Our formal treatment follows the strand of economic literature that uses global games (Carlsson and Van Damme 1993; Morris and Shin 2003; Angeletos et al. 2007) in modelling protest behaviour of the activists (Edmond 2011, etc.). Global games have recently been used to understand coordination

in elections (Myatt 2007) and strategic voting (Sarkar 2018), party leadership (Dewan and Myatt 2007), international conflict (Chassang and Padr o i Miquel 2010), and revolutions (Edmond 2013; Shadmehr and Bernhardt 2011; Tyson and Smith 2012). We borrow from the literature of revolutions and protest that technically follows the structure of Global Games as developed by Morris and Shin et al. and later applied in numerous political economy models. Lohmann (1994) etc. have looked at informational frictions involved in protesting as a costly signaling of private experiences about the regime strength between differently informed agents. Our set up similarly follows a noisy environment as typical in a Global Game structure.

The informational model by Edmond (2011) allows for a strategic government to manipulate quality and quantity of information through propaganda. Their model emphasizes informational frictions as it studies propaganda and signal. We also improvise political propaganda and competition in our extended model in a similar spirit. Our model is static and the noise in the global game structure helps us to solve the problem of multiplicity of equilibria.

We proceed to present our baseline model in the following section.

3.3 Theoretical Framework

3.3.1 Ideological Activism

We consider a one-period static model with a representative locality whose economy is primarily based on land, like agriculture, forestry etc. There is a Government, which is interested in developing the economy through industrialization like setting up of a factory, building infrastructure like constructing a dam, mining etc. The Government wants to acquire some amount of land for any such development project.[20] The Government is presumably acquiring only the minimally required land for the project to be feasible. The Government has legal power to acquire the land, forcefully if needed, by paying a compensation to the land losers.

The incumbent party in the Government is an office-seeker and gets a fixed utility of unity from the success of this project. This fixed utility can be the benefit enjoyed from being in office, or an ideological benefit from the industrial project, or both.[21] The chances of being in office is enhanced if the development project is successful.

The ownership of land is distributed uniformly, with each land owner owning one unit of land. So each land owner who's land will be used for the proposed project loses one unit of land. The Government offers to each affected land loser a compensation of c per unit of land. We assume the total size of land owners who are supposed to lose land for this project to be normalized to unity. The proposed compensation c is offered same to each and all of the affected land owners. The compensation c can take any non negative value, from 0 to infinity.

After the announcement of the project and knowing the amount of compensation c, the land losers will observe the prevailing state of economy in and around that region. They do so for understanding prospects of alternate work opportunities and employment, like to assess how much return to expect from investing the monetary compensation into alternatives etc., all of which can summarily give them an idea about what to expect from this

[20] We can think of any rural economy, like the L.D.C.'s, to suit such a framework, where land intensive industrialization is necessary for transformation into a developed economy.

[21] The Government may be intrinsically motivated to industrialize the economy for multiple benefits like increase in regional income, increase in government revenue, higher employment opportunities, higher standard of living and technological progress, development of markets and less pressure on land and agricultural growth, reduction in population growth etc.

opportunity cost of land ownership. These expected valuations of alternate opportunities may vary individually, as their skill levels may differ. Non economic factors like psychological attachment to land may also play a role. But the effect of current over all state of the economy is significant to each and is the *primary* determinant of future economic expectations, both individually and collectively. Thus, a land owner's *consent* to give up land willingly depends on two considerations in our model; the compensation offered and the state of economy.[22]

The state of the economy of that region can not be therefore fixed, but vary, and can get effected by any shock, local or external, like from the world economy, exogenously. We define state of the economy as a random variable ξ over the support of whole real line $(-\infty, +\infty)$ which follows a bell shaped distribution $F(\xi)$ with mean at 0 and variance σ^2. We normalize the expected shock to be 0. A higher value of ξ represents a better state of the economy and encourages the farmers to give their consent.

As the decision of the land owners agreeing to give up land willingly depend on two factors, viz. the compensation c and the state of the economy ξ, for simplicity, we define these two factors by a single variable called θ. This θ can be interpreted as the future state of welfare of the farmers in the absence of their land. Conceptually,

$$\theta = h(c, \xi)$$

where $h(.)$ can be any function increasing both in c and higher future economic uncertainity ξ. For further simplification, we assume $h(c, \xi)$ to be additive and re-define it as

$$\theta = c + \xi \tag{3.1}$$

This is one of the simplest structure for analytical tractability and, as verified, the results won't change otherwise with any similar formulation. After knowing the compensation and observing the state of the economy, each land-loser will decide whether she wants to give her land or not. There can be various reasons behind a land owner's unwillingness, like differences in individual valuation of land, non-economic factors like psychological attachment to land, low opportunity of alternate livelihood, unwillingness to migrate, lacking skills for any other kind of work etc. Technically, her consent is not binding on the Government as the Government has legal power to take over

[22]If we had considered personal evaluations of the state of the economy, the main results in our model wouldn't have changed.

the land forcefully for a *greater common good*. But being too much forceful can be politically very risky for the Government in a democratic set-up.

Before introducing the Government, we will explain the realization of unwilling land losers in our formulation first. An assumption in our design is that the Government doesn't and cannot know the actual size of unwilling land losers as multiple factors like bureaucratic inefficiency, wrong methodology of assessing valuation, out dated land records, corruption, weak property and exchange rights in land transactions etc. restrict the Government from accurately assessing the evaluations of land by its owners.

The number of unwilling land-losers is related to the above defined variable θ, comprising of the compensation c and the exogenous shock ξ. We formally define a bijective function $\phi(\theta)$ over the domain $\mathbf{R}$, which is the co-domain of θ, and range $[0, 1]$, which determines the size of land-losers who will be satisfied with the compensation and give up their land willingly. It may be recalled that increasing the compensation c and a higher economic opportunity outside land ξ will increase the willing size $\phi(\theta)$, and vice versa. Hence, the function

$$N(\theta) = 1 - \phi(\theta) \tag{3.2}$$

gives the size of unwilling land losers who do not want to give away their land to the Government at the offered compensation price. The land losers can realize, comparing with their personal valuations, whether they are willing or unwilling to give the land for the project.[23] It is important to understand that they may not *only* be dissatisfied with the compensation, because their decision depends on the state of the economy as well.[24] So reducing the size of unwilling landowners is not *entirely* in the hand of the Government. It is partly exogenous because of ξ. By offering a higher compensation, the Government *can* reduce their numbers, but only partly, depending on the state of the economy.

The bijective function $\phi(\theta)$ can be any one-to-one correspondence between N and the real interval $[0, 1]$. We assume it to be strictly increasing and invertible function of θ. As we had normalized the size of land owners in the economy to 1, and as the minimum number of willing land losers can be 0,

[23] In poor countries where Government's revenue is limited, financial constraints restrict the Government from adequately compensating the land losers who have high personal evaluations and attachment to their land.

[24] Some personal valuations of land may be so high, that the Government may be unable to compensate them given its' financial and budget constraints, and the possibility of some unwilling land losers may *always* remain for any amount of compensation.

any one-to-one correspondence between the real line $\mathbf{R}$ and the real interval $[0, 1]$ can suit our purpose. As an example, we can think of the standard logistic function to suit our purpose. We need to carefully define it over the domain $\mathbf{R}$ and range of open interval $(0, 1)$ instead of the closed interval $[0, 1]$. As no land loser remaining unwilling or all land losers remaining unwilling are both unrealistic and unlikely, we can conveniently rule them out to suit our assumption for considering the specific logistic functional form. For a simpler illustration, we proceed with this example in our model, defining

$$\phi(\theta) = \frac{1}{1 + e^{-\lambda\theta}} \tag{3.3}$$

where λ denotes attachment to land for all other exogenous reasons. Technically, $\frac{1}{\lambda}$ is the scale parameter of the Logistic distribution. The size of unwilling land losers is accordingly given by

$$N(\theta) = 1 - \frac{1}{1 + e^{-\lambda\theta}} \tag{3.4}$$

Note that our formulation implicates the number of unwilling land losers to be random too, as ξ itself is a random variable. Also, $N(\theta) \to 0$ for $\theta \to \infty$ and $N(\theta) \to 1$ as $\theta \to -\infty$

A certain section of the population is concerned about the state of democracy. They are commonly understood as *activists* who often have considerable influence on shaping public opinion and policy decisions. We define them as members of *civil society*, an exclusive set of population marked by their *activism*, different from the land-owners. These concerned citizens differ from normal citizens in two ways. Firstly, they are driven by democratic values, which is captured by our assumption that they are bothered about the democratic rights of other citizens in the society. Secondly, they are intrinsically motivated to participate in any mass activity to improve the condition of democracy, whenever they feel necessary. In our limited framework, they *protest* against the Government when they think the Government is unjustifiably violating the basic rights of some citizens: in this case the land-losing farmers. Each of them participate in a protest against the Government's industrialization initiative if she feels the Government has violated the democratic rights of a sufficiently high number of unwilling land losers by forcibly taking away their land.

The set of protesters who protest solely for the cause of democracy is

called *ideological* activists.[25] A member of this group protests against land acquisition, irrespective of what others are doing, provided in her perception the number of land losers is greater than or equal to a threshold value $\bar{N}$.[26] We assume that the size of ideological activists is μ_N.

In the beginning, the Government chooses c and the shock ξ is realized. As a consequence, the size of unwilling land losers $N(\theta)$ gets determined. Here on, for convenience, with slight abuse of notation, we will denote $N(\theta)$ by simply N. After N is realized, each civil society activist observes the size of unwilling land-losers N with a noise ϵ. The noisy environment is created either because civil society members imperfectly observe ξ, the alternate employment opportunity of land losers, or the function θ or both. In particular, if N is the actual size of dissatisfied land-losers, then an agent observes a signal $s \in [N - \epsilon, N + \epsilon]$ where the noise $\epsilon > 0$. We assume that s is uniformly distributed over its support. After observing the signal, each activist tries to infer the true value of N by arriving at the conditional expectation $E(N|s)$.

An ideological activist protests against the Government *iff* $E(N|s) \geq \bar{N}$. Otherwise, she does not engage in any protest.

We assume γ as that exogenous size of protest, which is sufficient to stall the project altogether. The pre-specified protest size γ is given as exogenous to the model and is perfectly known by all the agents.

We summarize the sequence of events below:

1. In the beginning, the Government announces per unit compensation c and acquires land by paying c to each land loser. The c is chosen such as to maximize the probability of success of the project less the cost of compensation. As we shall show, the choice of c depends on parameters like the distribution function of ξ, the marginal cost of borrowing the capital c from the rental market to pay for the compensation, the relative size of the civil society μ and their maximum tolerable plight of unwilling land losers $\bar{N}$.

2. Then the random variable ξ is realized.

[25] These activists are behavioral and not non-ideological or herd-follower. This behaviour captures the idea of value rationality by Weber (1922), where an action is value-rational when it is determined by a conscious belief in the value for its own sake, irrespective of its prospects of success.

[26] It is a society-wide cut-off and is known to all.

3. Given ξ, the actual state of their future welfare θ and hence the size of willing land losers $\phi(\theta)$ are realized. Consequently, the number of dissatisfied land losers N is realized.

4. Then all the activists observe the signal s for N, with some noise ϵ.

5. Each of the activists protests iff $E(N|s) \geq \bar{N}$.

6. Finally, the project fails iff the number of protesters exceeds the exogenous pre-specified size γ.

The reason behind compensation 'c' being chosen before the realization of the random shock ξ is that the idea is to capture all kinds of uncertainties which continuously prevail in the economy and affect the decision of willingness of landowners in addition to the compensation. These factors are beyond the control of the Government. Hence whenever the compensation is chosen, these uncertainties from exogenous factors will prevail and affect the decision of landowners due to its continuity. That is why realization of is modeled after announcing the compensation. Even if it is reversed, the situation will remain the same as there will be some uncertainty after that revision as well.

Moreover, whenever the Government gets to revise, the ultimate effect will be same as now modeled and there's no scope of gain from improvising revisions into our model. In addition to the same reason in the previous reply, there is a possibility of an added problem of holding out and bargaining arising from any scope of revision and increased compensation. Suppose the Government has the scope to revise. Then that will incentivise the rational farmers to strategically misreport their unwillingness, leading to an entirely different problem of holding out, deviating from the main purpose of our model.

We now proceed to compute the equilibrium.

Equilibrium

We start with computing the size of protest from an ideological civil society. As a representative ideological activist receives a signal s about $N(\theta)$, interchangeably denoted by N, she first tries to infer the true state of N by arriving at the conditional expectation $E(N|s)$. To find $E(N|s)$ we first note that for any given realized value N, the maximum and minimum signals an

agent can observe are $N+\epsilon$ and $N-\epsilon$ respectively. Hence, given any signal s, the receiver of the signal infers that the maximum and minimum realizations of N can be $N+\epsilon$ and $N-\epsilon$ respectively. Hence, we can calculate it as

$$E(N|s) = \int_{s-\epsilon}^{s+\epsilon} \frac{1}{2\epsilon} dN = s \tag{3.5}$$

Now she decides to protest *if and only if* $E(N|s) \geq \bar{N}$, which in turn requires $s \geq \bar{N}$ for protesting.

From here, we can calculate the proportion of ideological civil society $P(s \geq \bar{N})$ who will join the protest as

$$\mu_N P(s \geq \bar{N}) = \frac{\mu_N}{2\epsilon} \int_{\bar{N}}^{N+\epsilon} ds = \frac{\mu_N}{2\epsilon}[N + \epsilon - \bar{N}] \tag{3.6}$$

For any given N, the activists will be able to successfully stop the project for

$$\frac{\mu_N}{2\epsilon}[N + \epsilon - \bar{N}] \geq \gamma \tag{3.7}$$

Let N' be that value of N for which the above inequality is satisfied with equality. This means that for N', the protesters are just able to stall the project on the margin. We can solve for N' from the above equation as

$$N' = \bar{N} + \frac{\epsilon}{\mu_N}(2\gamma - \mu_N) \tag{3.8}$$

This acts a threshold size of unwilling land-losers such that if the realized size of unwilling land-losers exceed this N', then protests from civil society activists will be able to resist the project. We formalize it in the following Lemma below.

Lemma 1 *In equilibrium, the critical mass of unwilling land-losers sufficient to dislodge the project by protests from the activists is given by*

$$N' = \bar{N} + \frac{\epsilon}{\mu_N}(2\gamma - \mu_N)$$

The corresponding θ' can be calculated accordingly. Next we move on to the government's optimization problem for a complete solution of the equilibrium.

3.3.2 The Government's Choice

The Government's problem is to choose a c such as to maximize the probability of the development project, i.e. $P(N < N')$ or equivalently $P(\theta > \theta')$. For our convenience, we will use the latter from now on for further calculations. So the Government's *objective function* is given by

$$P(N < N') - R(c) \tag{3.9}$$

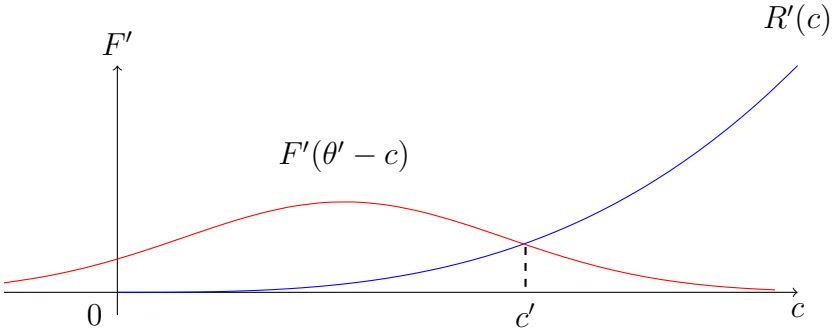
where $R(c)$ is assumed to be convex, i.e. $R'(c) > 0$ and $R''(c) > 0$.[27] The Government maximizes this function by choosing c.

Now substituting the expression of N in the above objective and using the distribution function of ξ, we get $P(N < N') = 1 - F(\theta' - c)$, which gives us the probability of the project to succeed. From here we derive the first order condition of the maximization exercise as

$$f(\theta' - c) = R'(c) \tag{3.10}$$

where $f = F'$.

The second order condition reduces to $-F'' - R'' < 0$. In our subsequent analysis, we assume $F'' > 0$ to always hold around the equilibrium to ensure uniqueness.



Optimal Choice of Compensation c^*

In equilibrium, two variables are simultaneously determined- the equilibrium level of compensation, denoted by c', and the equilibrium probability of success of the project $P'(N < N')$ or P' for short. As is shown in the figure, equilibrium occurs at the downward sloping portion of $f(\theta' - c)$. This follows from our assumption $F'' > 0$ around equilibrium. We proceed to extend our

[27] Recall that we had normalized the benefit of the Government to unity.

model adding another dynamics of protest behaviour and will compare the results obtained in this section with the newly arrived below.

3.3.3 Non-ideological Activism

Now we add another set of activists into our baseline framework, who's protest behaviour is understood not to be driven by any ideological motivation but rather on their individual cost benefit consideration. Hence their protest behaviour is strategic. So now, in addition to our earlier actors of the game, there is another set of protesters, also belonging to the civil society, who protest or remain silent depending on their perceived *private benefits* and *costs*. They are called *non-ideological activists*[28]. A non-ideological protester gets a private benefit ν if the project is stalled and nothing if the project is successful. Similarly, a non-ideological non protester, who sides with the Government, gets nothing if the project is stalled and ν if the project is successful.[29] Presumably, the protesters, if successful in stalling the project, gets a reward from the opposition party or from a rival industry group who is trying to arrest the present development drive. The political party opponent to the Government may help to organize the protest. Any influence group can be interested to use the protesters for lobbying. Similarly, the ruling party or the industry group implementing the project is likely to reward the silence of a non protester.[30] We assume that while the cost of protesting is $\delta > 0$, the cost of remaining silent is zero.[31] The size of non-ideological activists is assumed to be μ_S and $\mu_N + \mu_S = 1$. Finally for protests to be viable, we assume $\nu > \delta$.[32]

[28]They get more influenced by the surrounding environment of protest in the society. One possible explanation of such activism is 'herd behavior', which has been much discussed in the theories of human psychology

[29]These non ideological activists can campaign in support of the project too. This can range from organizing a counter protest to any program for support on any platform. It is common for public figures to engage with the Government for gathering support for its initiatives.

[30]There is no such material benefit for the ideological activists, as they purely behavioral, motivated by democratic values.

[31]Activism for as well as against the project may both bear costs. Its realistic to assume that the cost for supporting the Government is less, there by normalised to 0, making δ the net cost of protest.

[32]For notational simplicity we have assumed that the reward for success is the same for protesters and non-protesters. We can make them different without affecting the results

The sequence of events otherwise remain unchanged from earlier. In the beginning, the Government chooses c and the shock ξ is realized. As a consequence, the size of unwilling land losers $N(\theta)$ gets determined. Here on, for convenience, with slight abuse of notation, we will denote $N(\theta)$ by simply N. After N is realized, each civil society activist, both non-ideological and ideological, observes the size of unwilling land-losers N with a noise ϵ. The noisy environment is created either because civil society members imperfectly observe ξ, the alternate employment opportunity of land losers, or the function θ or both. In particular, if N is the actual size of dissatisfied land-losers, then an agent observes a signal $s \in [N - \epsilon, N + \epsilon]$ where the noise $\epsilon > 0$. We assume that s is uniformly distributed over its support. After observing the signal, each activist tries to infer the true value of N by arriving at the conditional expectation $E(N|s)$.

As an ideological activist protests against the Government *iff* $E(N|s) \geq \bar{N}$, a non-ideological activist protests if and only if her expected net benefit from protest exceeds her expected benefit from not protesting.

We summarize the sequence of events below:

1. In the beginning, the Government announces per unit compensation c and acquires land by paying c to each land loser. The c is chosen such as to maximize the probability of success of the project less the cost of compensation. As we shall show, the choice of c depends on parameters like the distribution function of ξ, the marginal cost of borrowing the capital c from the rental market to pay for the compensation, the relative size of the civil society μ and their maximum tolerable plight of unwilling land losers $\bar{N}$.

2. Then the random variable ξ is realized.

3. Given ξ, the actual state of their future welfare θ and hence the size of willing land losers $\phi(\theta)$ are realized. Consequently, the number of dissatisfied land losers N is realized.

4. Then all the activists observe the signal s for N, with some noise ϵ.

5. An ideological civil society activist protests if $E(N|s) \geq \bar{N}$.

of the paper.

6. An non-ideological activist gets a benefit ν by supporting the future winning side. She also incurs a net cost δ if she protests. She protests if her expected gain from protesting is at least equal to the expected gain of supporting the project.

7. Finally, the project fails iff the number of protesters exceeds the exogenous pre-specified size γ.

We now proceed to compute the equilibrium.

Equilibrium

The equilibrium behaviour of ideological activists remain same like before.

Here we compute the equilibrium behaviour of non-ideological activists, which is somewhat more complicated. We arrive at their equilibrium behaviour in three distinct steps.

First, we start with an arbitrary belief $\tilde{s}$ of a non-ideological activist which takes the following form: a representative non-ideological activist believes that all other non-ideological activists will join the protest to stop the project if and only if they observe a signal $s \geq \tilde{s}$. This arbitrary belief can take any value and may be different for each activist.

Secondly, given this belief, the representative activist calculates her best response $\hat{s}(\tilde{s})$. The best response involves the following: given that ideological civil society activists are protesting if and only if they get a signal $s \geq \bar{N}$, and other non-ideological activists are protesting if and only if they receive a signal $s \geq \tilde{s}$, it is optimal for this representative activist to join the protest if and only if she receives a signal $s \geq \hat{s}$.

Thirdly, the equilibrium signal s is one where $\hat{s} = \tilde{s}$, which we define as s^*. This constitutes a symmetric Nash equilibrium.

We define the value of N corresponding to s^* by N^*. Following the steps discussed above, we solve and present the equilibrium best-response signal of the non-ideological activists s^* and corresponding N^* in the following Lemma.

Lemma 2 *In equilibrium, the best response signal of each non-ideological activist above which they will protest is given by*

$$s^* = \bar{N} + \frac{2\epsilon}{\mu_N}[\gamma - \frac{1}{2}(1 - \frac{\delta}{\nu})]$$

Consequently, the corresponding size of unwilling land-losers above which the project will fail to materialize due to protest is given by

$$N^* = \bar{N} + \frac{\mu_S}{\mu_N}\frac{\delta\epsilon}{\nu} + \frac{\epsilon}{\mu_N}(2\gamma - 1)$$

Proof: See A.1.1

Since $\phi(\theta)$ was assumed to be one-to-one and invertible, we consequently solve the corresponding θ^* from here, where $N^* = 1 - \phi(\theta^*)$.

In equilibrium, therefore, the project succeeds provided the size of dissatisfied land losers N is less than this critical value N^*, or equivalently the θ exceeds θ^*. So, N^* and θ^* are exchangably the crucial variable in this model which determines chances of the project's success. The project succeeds provided the total number of un-willing land-losers $N(\theta)$ who's land has to be acquired forcefully, must be less than or equal to the critical value of unwilling land losers $N(\theta^*)$, and the chances for the project to materialize will be $P(N(\theta) < N(\theta^*))$. Hence, this is equivalent to the statement that the chances for the project to materialize is $P(\theta > \theta^*)$.

We assume that $N^* > \bar{N}$ through out the model. A sufficient condition for this to hold is

$$\gamma \geq \frac{1}{2} \tag{3.11}$$

This is a reasonable condition. It requires that the project is stalled if at least half of the civil society activists oppose it. We assume this condition to hold in all our further discussions.

This assumption makes the role of non-ideological activists necessary in determining the total participation size of civil society. Otherwise, protests only by ideological activists would have been sufficient to stop the project. That scenario would not have had any scope of their wider role like supporting, finally making the case very uninteresting.

Again, if $N^* \geq 1$, we have a situation where the project is always successful. To avoid such an uninteresting case, we assume that $N^* < 1$. This requires

$$\mu_N > \frac{\delta\epsilon + \nu\epsilon(2\gamma - 1)}{\delta\epsilon + \nu(1 - \bar{N})} \tag{3.12}$$

Since $\mu_N < 1$, for 5.8 to hold we require

$$\gamma < \frac{1 - \bar{N}}{2\epsilon} + \frac{1}{2} \tag{3.13}$$

Combining 5.9 with our earlier assumption of 5.13, in the subsequent analysis we assume that

$$\frac{1}{2} \leq \gamma < \frac{1-\bar{N}}{2\epsilon} + \frac{1}{2} \tag{3.14}$$

Next, we calculate the Government's optimal decision.

3.3.4 The Government's Choice

The Government's problem is to choose a c such as to maximize the probability of the development project, i.e. $P(N < N^*)$ or equivalently $P(\theta > \theta^*)$. For our convenience, we will use the latter from now on for further calculations. So the Government's *objective function* is given by

$$P(N < N^*) - R(c) \tag{3.15}$$

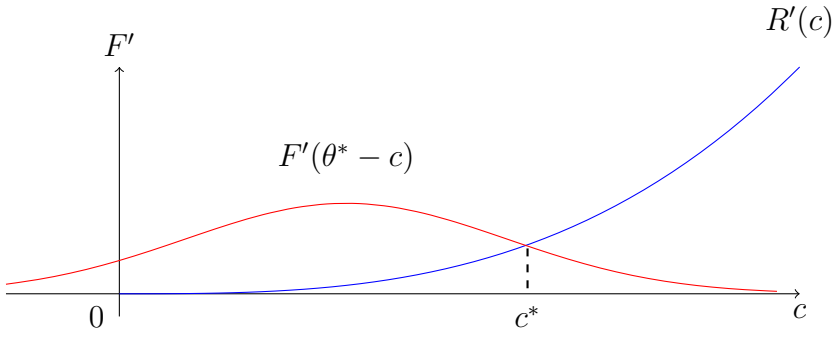
where $R(c)$ is assumed to be convex, i.e. $R'(c) > 0$ and $R''(c) > 0$.[33] The Government maximizes this function by choosing c.

Now substituting the expression of N in the above objective and using the distribution function of ξ, we get $P(N < N^*) = 1 - F(\theta^* - c)$, which gives us the probability of the project to succeed. From here we derive the first order condition of the maximization exercise as

$$f(\theta^* - c) = R'(c) \tag{3.16}$$

where $f = F'$.

The second order condition reduces to $-F'' - R'' < 0$. In our subsequent analysis, we assume $F'' > 0$ to always hold around the equilibrium to ensure uniqueness.



Optimal Choice of Compensation c^*

[33] Recall that we had normalized the benefit of the Government to unity.

In equilibrium, two variables are simultaneously determined- the equilibrium level of compensation, denoted by c^*, and the equilibrium probability of success of the project $P^*(N < N^*)$ or P^* for short. As is shown in the figure, equilibrium occurs at the downward sloping portion of $f(\theta^* - c)$. This follows from our assumption $F'' > 0$ around equilibrium.

An obvious step here would be to compare the finding of this section with those of the baseline model in the earlier one. The logical step would be to start with comparing among N' and N^* and an easy check reveals that $N' \geq N^*$ always. To verify, once can readily find that $N' < N^*$ implies $\delta > \nu$ which is inadmissible as per our assumption of $\delta > \nu$ to ensure participation of non-ideological activists in protests. Consequently, it's straightforward to conclude from here that $P^* > P'$ and $c^* < c'$. Thus we find that participation of non-ideological activists decreases the chances of the project's success thereby decreasing the compensation in equilibrium. We present this as our first result below.

Proposition 1 *Protests from non-ideological activists decrease the threshold size of unwilling land losers sufficient to resist the project, thereby increasing the equilibrium chances of the project's success and decreasing the compensation offered by the Government in equilibrium, as compared with the equilibrium of protests from ideological activists alone.*

The intuition behind this result lies in the strategic protest behaviour of the non ideological protesters which is driving this change in favor of the Government. This finding is logical and it's interpretation offers a mixed bag of policy suggestions. The higher chances of success may be interpreted as a positive effect where as lower compensation is undesirable. Thus the welfare implications of this finding is ambiguous and subject to interpretations and can be evaluated with more clarity with specific contexts.

We next move on to look at the effects of democratic activism as a whole on the choices of development. The crucial parameter determining the equilibrium values of the variables is θ^*, or equivalently N^*.

Let us first see how c^* and P^* change with respect to a change in θ^*. Differentiating the first order condition A.7 and using our assumption of convex cost and the assumption that $f' = F'' > 0$, we get

$$\frac{dc^*}{d\theta^*} = \frac{f'}{f' + R''} > 0 \tag{3.17}$$

and

$$\frac{dP^*}{d\theta^*} = f[\frac{f'}{f' + R''} - 1] < 0 \tag{3.18}$$

Next, we look at the factors influencing θ^* or equivalently, N^*. Our primary interest is to look at the role of civil society activism on development. So, our interest lies in the effects of the size and composition of civil society on the equilibrium values of the variables. First we consider a change in the composition of the civil society. From A.7 it is straight forward to see that an increase in the proportion of non-ideological activists of the civil society with the total size of civil society remaining the same, i.e. a rise in μ_N (with a corresponding fall in μ_S) unambiguously reduces N^* and hence increases θ^*. The implications of these findings are summarized in *Proposition* 4.3.2.

Proposition 2 *Suppose 5.10 holds. Then a rise in μ_N (and a corresponding fall in μ_S) increases equilibrium compensation and reduces the equilibrium probability of success of the project.*

Proof: See A.1.2

The Proposition 4.3.2 follows from 5.4, A.7, 3.17 and 3.18. A couple of comments on this proposition are in order. First, we talk about the intuition behind the result. A change in the composition of civil society in favour of non-ideological activists has the effect of Weakening protest. The signal at which an ideological activist protests may not induce a non-ideological activist to do so. This is because the latter is concerned with what others are doing and some other activists, both ideological and non-ideological, may observe signals at which they will not protest. All these taken together will reduce the number of protesters for any given realization of θ when there is an increase in the proportion of non-ideological activists. This in turn will increase the probability of success of the project for any realization of θ and the Government knowing this will reduce the compensation to offer.

Secondly, in terms of social desirability, the effect of a change in the composition of civil society is *ambiguous*. From the point of view of the society, a higher compensation to the land-losers, *ceteris peribus*, is desirable. On the other hand, an increase in the probability of success of the project is also desirable. A rise in the number of non-ideological activists reduces compensation but increases the probability of success. Hence, its welfare effect cannot be judged directly. If, however, the cost function $R(c)$ reflects *net cost* to the society after internalizing the benefit of giving compensation

to the land-losers, then no additional societal benefit can be perceived from an increase in compensation. In that case, a rise in the proportion of strategic voters increases social welfare. This is similar and consistent with our first result.

Next, we consider an increase in the size of civil society, keeping unchanged its composition. This increase is with respect to the size of the land losers, which is kept constant at unity. More specifically, μ_N, μ_S and γ increase in the same proportion $\alpha > 1$. We assume that the *fraction* of the civil society needed to dislodge the project through protest is remaining the same as before. We then rewrite A.7 as

$$N^* = \bar{N} + \frac{\mu_S}{\mu_N}\frac{\delta\epsilon}{\nu} + \frac{2\gamma\epsilon}{\mu_N} - \frac{\epsilon}{(1+\alpha)\mu_N} \tag{3.19}$$

A proportionate rise in μ_N, μ_S and γ keeps all other terms in the right hand side of 3.19 unchanged except the last term, which goes down. This in turn leads to a rise in N^*. Consequently, we have the following proposition:

Proposition 3 *For any given size of land-losers, a rise in the size of civil society activists, keeping its composition constant, reduces equilibrium compensation and increases the probability of success.*

A natural question to ask is, what happens when the activists can fairly observe the state of the economy ξ or θ or both, more closely? Relaxing this basic feature of our baseline model corresponds to $\epsilon \to 0$, where we find the role of non-ideological activism to faze out, unlike our previous results. We state this in the proposition below:

Proposition 4 *When $\epsilon \to 0, N^* \to \bar{N}$. This means that for a noiseless economy, development is completely determined by the standard set by ideological civil society activism.*

This result has an interesting implication. In a society where the state of the economy is closely discernible, a *responsible* ideological activism can be interpreted as one with a reasonably high $\bar{N}$, which will be both economically and socially desirable. When the ideological activism is irresponsible, i.e. when $\bar{N}$ is sufficiently low, the future development of the economy will get hampered. Thus, the behaviour of ideological activists in choosing the $\bar{N}$ is the sole determinant of the society's economic development in a noiseless environment.

The above propositions 4.3.2, 3 and 4 provide us a full picture of the dynamism between ideological and non-ideological activism and the different conditions under which each of it can play effective roles on development.

Another characteristic of the society built in our model was λ, the over all attachment, *on average*, of the land owners of the region to their land, stemming from all exogenous reasons, both *economic* and *non economic*. The characteristic λ varies from regions to societies over time. It is one of the determinant variable of the number of unwilling land-losers N in our model. We find its positive effect on compensation and negative effect on development quite straightforward and intuitive. This is presented below:

Proposition 5 *If the attachment of land owners to their land λ rises, chances of the project's success P^* becomes difficult. This also increases the choice of compensation c^* by the Government.*

To see its' effect on our equilibrium variables of interest, one can check that $\frac{\partial N^*}{\partial \lambda} < 0$ and hence $\frac{\partial P(N<N^*)}{\partial \lambda} < 0$ and $\frac{\partial c^*}{\partial \lambda} > 0$ follow easily.

Before concluding this section of our baseline model, We summarize below some observations about the equilibrium obtained from the comparative static analysis.

Proposition 6 *In equilibrium, under our underlying assumptions,*

1. *If protesting for the non-ideological activist becomes costlier with a rise in δ, chances of the project's success P^* increases with a fall in the compensation c^*.*

2. *A rise in their private benefit ν, with cost of protest remaining same, decreases equilibrium success probability P^* but increases the compensation c^*.*

3. *A noisier economy, with an increase in noise ϵ, reduces the compensation c^* and increases the chances of project's success P^*.*

4. *A rise in the threshold protest size γ increases the development chances P^* and decreases compensation c^*.*

They follow from 3.17, 3.18 and simple first order derivatives. All these findings are intuitive and the discussions are in order.

Firstly, from A.6 and A.7, a rise in δ decreases the expected net benefit of protest, i.e. the right hand side of A.4 and increases the equilibrium best response signal of non-ideological activists s^*. This decreases their participation in protest and drives up P^*. Understandably, costlier protest deters more non-ideological activists from protesting. Consequently, decrease in total protest drives down the compensation too.

Secondly, an increase in ν on the other hand decreases the equilibrium best response signal of non-ideological activists s^*, there by increasing their chances of their participation. A larger protest drives the P^* down and increases compensation of land-losers.

The intuition behind the third result becomes easier to understand by looking at the best response signal of non-ideological activists in equilibrium in a noiseless economy. Notice that $s^* \to 0$ as $\epsilon \to 0$. An increase in ϵ increases s^*, which in turn decreases the participation size of non-ideological activists $\mu_S P(s \geq s^*)$ in equilibrium. This dip in protest size drives up P^* and lowers the compensation.

Lastly, γ increasing s^* is evident, and by similar reasons, the result follows. If dislodging the project becomes difficult, chances of its success becoming higher is straightforward. This reduced threat for the project drives down the compensation offer by the Government.

The above Propositions are the primary findings from our baseline model. We now move on to further extensions of this model.

3.4 Protest Function

So far, we had examined only the protest dynamics of activists in our model. In our context, land losers joining the protest too is an obvious case to consider.[34] Now we look at what happens when the affected un-willing land losers along with the activists join in the protest. In reality, the directly affected stakeholders are mostly the first ones to protest. As our primary focus in this paper is civil society activism, we had focused only them in our baseline model. But it is imperative to look at the larger picture, which we do in this section. This extension makes both our context and the model more general.

Everything remaining same like before, the only change we incorporate here is that, the total protest now is composed of the dissatisfied land-losers

[34]Land losers is specific to our context. It can be any other agent in other contexts.

too, in addition to the civil activists, both ideological and non-ideological. For this purpose, we define a *protest function* $P(\mu_p(N, s, \mu_s), N)$ where $\mu_p(N, s, \mu_s)$ is the total size of activists of both types participating in the protest, with $P_1, P_2 > 0$. Since the activists decide on joining the protest based on their signals about N, the size of activists protesting is itself also a function of unwilling land losers N. The land-losers who are satisfied with the compensation, or are willing to give up their land otherwise have no reasons to join the protest.

We make here a crucial assumption about the protest function $P(\mu_p(N, s, \mu_s), N)$. We assume that the protesting roles of activists and land losers are not perfect substitutes. Although we do not assume any explicit form of the protest function, we argue that a linear form is unsuitable.

In real life, the effect of civilians getting down to protests are multilayered and qualitatively different. It leaves deeper impression on urban and intellectual life, giving rise to thoughtful debates across the society. Citizens' protest is not a regular phenomenon as compared to protests by directly affected stakeholders over an issue. In a sense, civil society activism carry more weights than the land losers in attracting wider public and media attention. We emphasize this distinction of the qualitative effects between land-losers' and citizens' participation while conceptualizing this protest function. Everything else remains same as before.

Proceeding like before, based on the belief $\tilde{s}$, let the protest now be just successful for $N = N_0$, which gives us

$$P(\mu_p(N_0, \tilde{s}), N_0) = \gamma \tag{3.20}$$

Again, a non-ideological activist will calculate her best response from $\hat{s}(\tilde{s})$ when

$$\nu P(N < N_0) = \nu P(N \geq N_0) \tag{3.21}$$

i.e. when she is indifferent between protesting and supporting the project.

From 3.21, we can solve the best response $\hat{s}(\tilde{s})$ which will be same like before, i.e.

$$\hat{s} = N_0 + \frac{\delta\epsilon}{\nu} \tag{3.22}$$

Equating $\hat{s} = \tilde{s} = s_0^*$, the equilibrium cut-off signal in equilibrium and there by substituting 3.22 in 3.20, we can solve for the corresponding threshold size of protesters N_0^* implicitly.

Turning next to the Government, it's problem of maximizing

$$P(N < N_0^*) - R(c) \tag{3.23}$$

w.r.t. c remains same.

We proceed like before arriving at the same F.O.C:

$$F'(\theta_0^* - c) = R'(c) \tag{3.24}$$

to determine the equilibrium value of compensation c_0^* say, where $N_0^* = 1 - \phi(\theta_0^*)$. Note that the difference between c^* earlier determined and c_0^* depends on the difference between N^* and N_0^*, explanation of which is straight forward. We then look at $\frac{\partial P(N<N_0^*)}{\partial \mu_S}$ to re-examine our main result from the previous section. It is easy to verify that the sign remains negative, i.e. unchanged. This validates our result for a broader scenario too which we formalize below.

Proposition 7 *When un-willing land losers join the protest, effect of civil society activism on the project's success remains unchanged like before. Under reasonable difficulty to dislodge the project ($\gamma > \frac{1}{2}$), a rise in the size of non-ideological activists μ_S increases the project's chances where as increase in the size of ideological activists μ_N increases the compensation for land-losers.*

Proof: See A.1.3

The result is intuitive along the same line of logic argued before. As the non-ideological activists have can go either way in supporting or protesting the Government, and an increase in their size decreases the size of ideological protesters, hence altogether they help in succeeding the project. This result establishes our previous finding in a broader and more general framework.

3.5 Politicization of land-acquisition

Till now, our model had only the Government and no opponent political party. It was the compensation optimally chosen by the Government along with the realization of the economic shock ξ which determined the future of the development project. Now we extend our baseline model to an environment with political competition over the issue of forceful land-acquisition. In

the limited context of the model, we consider a single political issue in the scenario, which revolves around the land acquisition for this project.

For simplicity, we assume here two active political parties which are engaged in a continuous political battle involving campaigns and rallies against each other.[35] One of these parties, which is ruling the Government, was already in our benchmark model, and was playing the role of deciding the amount of compensation only. Now we extend it's role as an active political entity as well, who is engaged in political campaigning in addition to giving the compensation. Hence forth, we call this party ruling the Government as the *Incumbent*.

We also introduce a new political party, viz. the *Opposition*, which is not in power and is engaged in a political competition with the Incumbent party, contesting for office. We model the political activities of the parties as campaigns against each other's propaganda. The purpose of the Opposition's political campaigns is to project the failures of the Incumbent. On the other hand, the Incumbent campaigns for its' developmental drive, viz. this project. There can be exaggerations from the campaigns by both sides. As a result of this political competition, the noise in the signals received by the civil society activists goes up.

The Opposition wants to maximize the protests against the acquisition so that the Incumbent fails to implement the project. As a result of this failure, public dissatisfaction can grow towards the Incumbent. On other hand, the objective of the Incumbent remains same like before, with an additional task of choosing the optimal level of campaign expenditure, along with the compensation. The Incumbent wants to implement this project to claim credit for the successful development in its' electoral campaign. The Opposition in its campaign wants to exploit the economic insecurity of farmers, by exaggerating future income uncertainity and inadequacy of the compensation. Its aim is to persuade more activists for the protest to dislodge the project. The Incumbent wants to exaggerate the adequacy of compensation amount and future prospects of the land losers. Their aim is to dissuade more activists from turning against the project. In our specific scenario, the Opposition wants to exaggerate the number of unwilling land losers in its campaign to invite more protesters, where as the Incumbent wants to under report the actual number of dis-satisfied land owners who's

[35]Even in a multi-party system, two major political parties usually dominate in the long run

land are being forcefully taken by the Government.

Specifically, we define α and β to be the levels of political activities by the Incumbent and Opposition respectively. These activities can be thought of as publicity resulting from political campaigning around the issue. As a consequence of this political competition, an agent observes the signal s about unwilling land-losers where $s \in [N - \alpha\epsilon, N + \beta\epsilon]$. In other words, higher political activity by the Incumbent increases the range of low signals about N where as higher campaigning by the Opposition increases the upper limit of the range of noise. We assume that the total cost of indulging into political publicity of level α by the Incumbent is given by the cost function $c_I(\alpha)$. Similarly, the total cost of indulging into political activity of level β for the Opposition is given by the cost function $c_O(\beta)$. We also assume that for any level of political activity $x, c_I'(x) = c_O'(x)$. Finally we assume that $\alpha \geq 1$ and $\beta \geq 1$ and $c_I(1) = c_O(1) = c_I'(1) = c_O'(1) = 0$. These assumptions ensure that when there will be no political campaigning, the total cost and marginal costs will be zero. The publicity levels α and β will be chosen simultaneously by each party.

The success of the project is related to the electoral prospect of the Incumbent. It will have to choose α and c simultaneously, keeping it's objective of the project's success in mind. Hence the objective function of the Incumbent will change for the additional choice of α, along with the simultaneous choice of compensation c. The modified the *objective function* of the Incumbent now is the following:

$$P(N < N^*) - R(c) - c_I(\alpha)$$

The Opposition party will politically benefit if the Incumbent's project fails by discrediting them for their failure. Any protest against the Government will create an opportunity for the Opposition to cash in for political advantage. The objective of the newly introduced Opposition political party is to minimize the electoral prospects of the Incumbent by optimally choosing β. Hence, the *objective function* of the Opposition becomes

$$P(N \geq N^*) - c_O(\beta)$$

Note that the behaviour of the political parties are classically Downsian (1957a) who are purely office seekers. The Incumbent party is ideological only to the extent of being committed to a development project. So they may be interpreted as partially behaving in the sense of Wittman. But as

we are not modelling the voting procedure explicitly, classifying the party behaviour as Downsian or Wittman is not of much relevance.

We specify the sequence of events below.

1. The Incumbent party in power, i.e. the Government chooses c and α simultaneously by maximizing the chances of the project, and acquires the land by paying c as compensation. Simultaneously, β is chosen by the Opposition which maximizes the chances of failure of the project, minus the cost of carrying its political activities.

2. The ξ is realized.

3. Given ξ, the actual size of unwilling land losers N is realized.

4. N is observed with noise like before. Each civil society activist receives a signal s about N which can now be affected by the activities of the political parties, the Incumbent and the Opposition, viz. α and β. So N is observed with a wider noise where now the signal is uniformly distributed over its support $[N - \alpha\epsilon, N + \beta\epsilon]$.

5. All other events remains same like before. An ideological activist protests if and only if her $E[N|s] \geq \bar{N}$.

6. A non-ideological activist protests if she infers from his signal whether sufficiently large number of other activists are will protest. She protests if her net expected gain from protesting is at least equal to that of supporting it.

7. If the total size of protest crosses the exogenous limit γ, then the project is abandoned, like before.

Note that even if the opposition party chooses β after the realisation of Ξ and thereby N, it's objective function and hence the entire exercise of the problem remains unchanged. So the optimal solution of the political competition ultimately remains unchanged as a simultaneous choice of campaigns between the two parties.

We proceed to solve the equilibrium in similar steps like before.

3.5.1 Political Equilibrium

The equilibrium is determined in two stages. Firstly, given any arbitrary pair of signal $s(\alpha;\beta)$ we determine the equilibrium signal $s^*(\alpha;\beta)$ such that an unwilling land loser observing a signal at least as large as $s^*(\alpha;\beta)$ protests against the Incumbent. We then determine the corresponding N^* which is now understandably a function of α and β, and we denote it as $N^*(\alpha,\beta)$. The interpretation remains the same. It is that critical mass of unwilling land losers above which the proposed project fails to materialize due to the protest. Equivalently, we can calculate $\theta^*(\alpha;\beta)$ where $N^*(\alpha;\beta) = 1 - \phi(\theta^*(\alpha;\beta))$. Secondly, given these functions $s^*(\alpha;\beta)$ and $N^*(\alpha;\beta)$, the two parties will simultaneously solve their equilibrium choices of α^* and β^* which will constitute a Nash equilibrium.

It is realistic to assume that the activists are aware of political propaganda and the exaggerations resulting from that from both sides. Activists in real life are usually more aware and informed citizens in general. They are are supposed to be more conscious to find out the actual size of unwilling farmers trying to put aside all political noise.

Like before, non-ideological activists know that ideological activists will protest against the Incumbent's project if, after they receive a signal s, their expected N exceeds $\bar{N}$. Like our baseline model, ideological civil society engages in protest only after their expected N exceeds $\bar{N}$. For a non-ideological activist, she starts with an arbitrary belief s_0 that if other non-ideological protesters receive a signal more than s_0, they will start protesting against the Incumbent. Given this belief, our representative land loser perceives that the Incumbent's project fails if the expected total size of protest from the activists and land losers exceed γ. Next we find the best response $\hat{s}$ to the belief s_0. So $\hat{s}$ is that signal at which net expected benefit from protesting against the Incumbent is equal to that of supporting it. From there we can finally solve the equilibrium signal $s^*(\alpha,\beta)$ and the corresponding N^* which is now a function of α and β as $N^*(\alpha,\beta)$.

We proceed as before. We first calculate the size of ideological civil society $a'(\mu_N, N;\alpha,\beta)$ joining the protests. Their size now has become a function of political activities understandably. In our model, The activists are perfectly informed about the political noise α^* and β^*. They adjust the expected size of disgruntled farmers from the signal from the signal they receive. An ideological activist now knows that she will observe a signal s in $[N-\alpha\epsilon, N+$

$\beta\epsilon]$ and not $[N-\epsilon, N+\epsilon]$ like previously. After receiving a signal s she will infer the actual number of unwilling land losers N which now lies in the interval $[s-\beta\epsilon, s+\alpha\epsilon]$. Hence she will infer the actual state as

$$E[N|s] = \int_{s-\beta\epsilon}^{s+\alpha\epsilon} \frac{N}{(\alpha+\beta)\epsilon} dN = s + \frac{(\alpha-\beta)\epsilon}{2} \tag{3.25}$$

Now, she will protest against the project *if and only if* $E[N|s] \geq \bar{N}$. This condition reduces to $s \geq \bar{N} - \frac{(\alpha-\beta)\epsilon}{2}$.

We proceed exactly like before to calculate the participation from ideological and non-ideological activists based on their signals and beliefs. The detailed calculation is given in Appendix A.1.4. We denote the equilibrium best response signal of non-ideological activists by $s^*(\alpha, \beta)$ which now depends on the political campaigns. We denote the corresponding size of unwilling land-losers by $N^*(\alpha, \beta)$ which acts as the threshold size about which the protest will be successful to dislodge the project amid the politicization. These are presented in the second lemma.

Lemma 3 *In the presence of political tussle over land-acquisition, the best response signal for the non-ideological activists above which its optimal for them to protest is given by*

$$s^*(\alpha, \beta) = \bar{N} - \frac{\epsilon}{\mu_N}[\alpha - (\alpha+\beta)(\gamma + \frac{\delta}{2\nu})]$$

The threshold size of unwilling land-losers sufficient to dislodge the project in equilibrium now becomes

$$N^*(\alpha, \beta) = \bar{N} - \frac{\epsilon}{\mu_N}[\frac{\mu_S}{2}(\alpha-\beta) - (\alpha+\beta)(\frac{\mu_S\delta}{2\nu} + \gamma - \frac{1}{2})]$$

We will use this lemma 4.5 in the next proposition.

Note that now for $\bar{N} \leq N^*(\alpha, \beta) \leq 1$, the condition on γ reduces to

$$\frac{1}{\alpha+\beta}[(\alpha-\beta)\frac{1+\mu_S}{2}+\beta] - \mu_S\frac{\delta}{2\nu} \leq \gamma \leq \frac{1}{\alpha+\beta}[(1-\bar{N})\frac{\mu_N}{\epsilon}+\beta+\frac{\alpha-\beta}{2}(1+\mu_S)] \tag{3.26}$$

which we assume to hold through out this section.

Also note that $N^*(\alpha, \beta)$ is not directly comparable with N^* about which is greater, and it depends on the political choices α and β in equilibirum.

Now, from 4.5 we can readily observe that

$$\frac{\partial N^*(\alpha,\beta)}{\partial \alpha} = \frac{\epsilon}{\mu_N}[\gamma - \frac{1}{2}(1+\mu_S(1-\frac{\delta}{\nu})] = \frac{\epsilon}{\mu_N}\gamma_\alpha$$

and

$$\frac{\partial N^*(\alpha,\beta)}{\partial \beta} = \frac{\epsilon}{\mu_N}[\gamma - \frac{1}{2}(1-\mu_S(1+\frac{\delta}{\nu})] = \frac{\epsilon}{\mu_N}\gamma_\beta$$

as defined.

Now, by simple algebra, $1-\frac{\delta}{\nu} > 0$ and $1+\frac{\delta}{\nu} > 0$ together imply $\gamma - \frac{1}{2}(1+\mu_S(1-\frac{\delta}{\nu})) < \gamma - \frac{1}{2}(1-\mu_S(1+\frac{\delta}{\nu}))$, i.e. $\gamma_\alpha < \gamma_\beta$. Therefore,

$$\frac{\partial N^*(\alpha,\beta)}{\partial \alpha} < \frac{\partial N^*(\alpha,\beta)}{\partial \beta} \tag{3.27}$$

Determination of their optimal political behaviour will give us the full picture.

Political Choices

Next we consider the choice of α and β. When the two parties choose their levels of political activities they anticipate how the game is going to be played subsequently. In particular each party anticipates the subsequent first order condition involving the choice of compensation c and α and β. The Incumbent chooses c and α to maximize

$$P(N < N^*(\alpha,\beta)) - R(c(\alpha,\beta)) - c_I(\alpha)$$

which is equivalent to

$$1 - F(\theta^*(\alpha,\beta) - c(\alpha,\beta)) - R(c(\alpha,\beta)) - c_I(\alpha) \tag{3.28}$$

The first order conditions for the maximization of the Incumbent are

$$F'(\theta^*(\alpha,\beta) - c(\alpha,\beta)) = R'(c) \tag{3.29}$$

and

$$-F'.(\frac{\partial \theta^*(\alpha,\beta)}{\partial \alpha} - \frac{\partial c(\alpha,\beta)}{\partial \alpha}) = R'.\frac{\partial c(\alpha,\beta)}{\partial \alpha} + c_I'(\alpha) \tag{3.30}$$

where $f = F'$.

Similarly the Opposition chooses β to maximize

$$P(N \geq N^*(\alpha, \beta)) - c_O(\beta) \tag{3.31}$$

The first order condition of the Opposition is

$$F'.(\frac{\partial \theta^*(\alpha, \beta)}{\partial \beta} - \frac{\partial c(\alpha, \beta)}{\partial \beta}) = c'_O(\beta) \tag{3.32}$$

It's easy to see that

$$\gamma_\alpha \geq 0 \Leftrightarrow \frac{\partial N^*(\alpha, \beta)}{\partial \alpha} \geq 0 \Leftrightarrow \frac{\partial \theta^*(\alpha, \beta)}{\partial \alpha} \leq 0 \tag{3.33}$$

As the L.H.S. of the reduced F.O.C. of the Incumbent has to be always positive, hence $\alpha^* > 1$ always in equilibrium for $\gamma_\alpha \geq 0$.Otherwise for

$$\gamma_\alpha < 0 \Leftrightarrow \frac{\partial N^*(\alpha, \beta)}{\partial \alpha} < 0 \Leftrightarrow \frac{\partial \theta^*(\alpha, \beta)}{\partial \alpha} > 0 \tag{3.34}$$

.

But as this makes the L.H.S of the Incumbent's F.O.C. negative, and R.H.S. always remaining positive, hence to ensure the F.O.C. the Incumbent will minimize its campaigning, i.e. $\alpha^* = 1$.

Similarly looking at the Opposition's objective,

$$\gamma_\beta < 0 \Leftrightarrow \frac{\partial N^*(\alpha, \beta)}{\partial \beta} < 0 \Leftrightarrow \frac{\partial \theta^*(\alpha, \beta)}{\partial \beta} > 0 \tag{3.35}$$

This implies that the Opposition wants to minimise its political campaign around this issue as its entire objective is to decrease θ^*. So for $\gamma_\beta < 0$, the equilibrium choice of Opposition's political campaign is $\beta^* = 1$.

On the other hand,

$$\gamma_\beta \geq 0 \Leftrightarrow \frac{\partial N^*(\alpha, \beta)}{\partial \beta} \geq 0 \Leftrightarrow \frac{\partial \theta^*(\alpha, \beta)}{\partial \beta} \leq 0 \tag{3.36}$$

. So from the F.O.C.s, the Opposition's equilibrium choice of political campaign is greater than unity, i.e. $\beta^* > 1$.

Now notice that

$$\gamma_\alpha \geq 0 \Leftrightarrow \mu_S < \frac{2\gamma - 1}{1 - \frac{\delta}{\nu}} \tag{3.37}$$

and vice versa otherwise. Also,

$$\gamma_\beta \geq 0 \Leftrightarrow \mu_S > \frac{1-2\gamma}{1+\frac{\delta}{\nu}} \tag{3.38}$$

and otherwise, which always holds because the R.H.S. $\frac{1-2\gamma}{1+\frac{\delta}{\nu}}$ is always negative from the assumption $\gamma > \frac{1}{2}$ and μ_S by definition is a positive fraction. But note that

$$\gamma_\beta < 0 \Leftrightarrow \mu_S < 0 \tag{3.39}$$

which is inadmissible. Thus

$$\gamma_\beta \geq 0 \tag{3.40}$$

always.

Let's define

$$\mu_N^0 = 1 - \frac{2\gamma - 1}{1 - \frac{\delta}{\nu}} \tag{3.41}$$

which is same as defining

$$\mu_S^0 = \frac{2\gamma - 1}{1 - \frac{\delta}{\nu}} \tag{3.42}$$

Thus, summarizing the above findings, we can claim that for

$$\gamma_\beta \geq 0 \Leftrightarrow \beta^* > 1 \tag{3.43}$$

holding always, we get

$$\gamma_\alpha < 0 \Leftrightarrow \mu_S < \mu_S^0 \Leftrightarrow \mu_N > \mu_N^0 \Leftrightarrow \alpha^* > 1 \tag{3.44}$$

and

$$\gamma_\alpha \geq 0 \Leftrightarrow \mu_S \geq \mu_S^0 \Leftrightarrow \mu_N \geq \mu_N^0 \Leftrightarrow \alpha^* = 1 \tag{3.45}$$

We formally interpret the implication of these findings in the following result.

Proposition 8 *The Opposition always politicizes the land acquisition issue ($\beta^* > 1$).*
When ideological activism is sufficiently high ($\mu_N > \mu_N^0$), the Incumbent

engages in political propaganda ($\alpha^* > 1$). Otherwise, the Incumbent doesn't campaign ($\alpha^* = 1$) when proportion of ideological activists are sufficiently low ($\mu_N < \mu_N^0$). Hence, ideological activism and Incumbent's politicization are complementary.

The interesting insight from this result is to see that ideological activism and Incumbent's politicization are complementary..

The reason for such a finding can be found from 3.25. Note that in our non-ideological activists play the crucial role in our frame work. The equilibrium threshold of unwilling land-losers N^* and hence the probability of success P^* cannot be determined without them. The non-ideological activists are *informed* of α and β, and internalize these campaign generated noise while inferring the conditional expectation about N. Hence, for any signal s, for a high campaign α by the Incumbent, they infer that s underestimates the true number of unwilling land-losers N. Similarly, for a high campaign β by the Opposition, s overestimates N. They improvise this knowledge to adjust their estimate of N.

contrary to the popular belief that it's the Opposition and activists' roles which are complementary and hence is of interest.

3.6 Discussion and Concluding Remarks

We briefly discuss some distinct features of our baseline framework in the following.

Civil society is not a homogeneous entity in real life. Our framework classified into two types of protesters attempt to capture the entire activism space of the society.

In our framework, ideological civil society accommodates only those citizens who are ideologically motivated rights-activists, committed to *democratic values*. This way of capturing democratic injustice is very specific, in line with the recent work of Besley et al. (2018). The idea of reference-dependent preferences, first introduced by Kahneman et al. 1979 helps to distinguish democratic values from standard preferences.

We find that the threat of such democratic activism pushes the Government in offering a generous compensation. Higher activism indirectly increases the bargaining power of the land losers through protests, and in a sense contributes to an idea of *economic justice*.

Contagious protest is the central feature of our protest model. When more people join in a protest, it firstly sends a message to the people that the protest is necessary and justified. It convinces the people of justification of the issue. Secondly, it convinces them of better chances of the protest's success. As a result, more people join in the protest. This is known as the bandwagon effect in psychology. Such protesters may not be ideologically motivated or regular activists, protesting occasionally only when a protest gets largely popular. We collectively call them non-ideological protesters. All these features make a protest contagious.

Non-ideological protesters usually fall under the influence of the surrounding environment of discontent over an issue, resulting in a 'herd behaviour' of protest. We follow this standard assumption from the widely accepted theory of human psychology on in protest behaviour.

Another aspect of non-ideological activism in our model is *strategic behaviour*resulting from various possible motives. In real life, when protests at one place gain attention, protests with similar concerns at other places grow spirally, as a result of *demonstration effect*. Opportunistic protesters often join the trend when a protest gets popular. Some activists working with little attention on other issues also take the opportunity of popular protest somewhere to re-brand their effort. When protests appear to be successful, outsiders pour in resources, including money and man power to use the platform for promoting their own causes. Active existence of support and interest groups for either side of an issue is a very realistic feature. Many international organizations like United Nations run networks of civil society groups with social and economic specific goals. Numerous private and multinational organizations, including think-tanks, engage in policy activism across the countries. Accusations against civil society organizations working on multiple issues acting as lobbyists for various international state and non-state actors is a common debate in public sphere. They influence and motivate local activists in their favor. All these features make the protest participation *strategic* and get captured in our model by the private costs and benefits of non-ideological protesters.

The most non-trivial result is that ideological activism is the sole determinant of development in a noiseless economy. It is also non trivial that the optimal choices of political campaign by the parties are not the same as in a Nash equilibrium of standard duopolistic framework. Also, only one party's choice depends on the civil society's activism instead of both, which is also counter intuitive and non trivial, but matches with real life experiences. The

complementarity of ideological activism and Incumbent's politics is another most important takeaway from this paper, which is contrary to the popular belief that it's the Opposition and activists' roles which are complementary.

A logical extension of this paper is to develop a dynamic version of the model in various directions. A simpler extension can be the case where protest decisions are based on the number of past occurrences of protests. Another possible direction is to endogenize the composition of civil society, based on the transmission of democratic values across generations.[36]

A limitation of this paper is the lack of empirical testing of the results. It is difficult to get data and resources on such qualitative and politically contentious issues, especially from the L.D.C.s. This calls for a separate work on its' own. To this far, our novel attempt in the land-acquisition literature can be extended to model other issues in modern economic theory using the present framework. There lies the most significance of this work.

[36]This can contribute to the newly growing literature of cultural economics and social norms

Chapter 4

Political Violence and Informal Sector

[1][2]

4.1 Introduction

It is a well established fact that Less Developed Countries (L.D.C.s) experience more political violence on average than the developed economies. This evidence is plenty from various studies on different themes (Lewis et al. 2019, Peksen et al. 2020, Ouédraogo, (2017) etc.). Related observation correlates large informal sectors within the economy of the L.D.C.s (E.S.R.C., 2017). A natural question emerges: is there any causal link? The question is very important in a political economy context too because in a weakly institutionalized framework like the L.D.C.s most of the population working in informal sectors depend on various kinds of shelter and protection from the political parties.

Typical characteristics of L.D.C.s include high conflict, high inequality

[1] A paper based on this chapter Sarkar and Sinha (2018, revised 2021) has been conditionally accepted by the journal Economic Modelling subject to 'professional copy-editing' for publication.

[2] The authors wish to thank Prof. Soumen Sikdar, Soumyanetra Munshi, Saurabh Bhattacharya, Sarabjit Sengupta, Samarjit Das, Atanu Biswas, Souvik Dutta, Satwik Santra, Arindam Paul and all the conference and seminar participants at Indian Institute of Management, Ahmedabad, Viswabharati University, University of Calcutta and Indian Statistical Institute, Kolkata for their helpful comments.

and unemployment with large informal sector, weak institutions, etc. High unemployment compels the need for survival, which is one of the primary determinants of informal economy (see Sarkar 2010, 2018 for additional and illustrious arguments). A large section of the population in these countries do not have access to proper skills, education and job opportunities, and are forced to work in the informal sector for their livelihood. L.D.C.s are also characterized by weak institutions with inadequate legal and property rights, particularly more so for the informal sectors. Hence informal economies in these countries can be characteristically defined as the sector where the rule of law is lacking for its' workers. The economic activities of this sector are mostly unregistered, where the formal laws of tax, labor and environment are flouted. Typical examples include vendors illegally hawking on pavements or streets, unregistered production units neither complying to tax rules nor following to minimum wage laws, small shop-owners and businessmen unprotected from local goons, individual and small farmers dependent on various subsidies etc. On other hand, the limitedly effective legal system is costly and affordable only for the privileged class and hence inaccessible to the poor. This in turn makes the informal sector workers legally unprotected and susceptible to corruption (like extortion), violence etc. In totality, weak institutions is a double edged sword for the informal sector workers who themselves have to engage in semi legal work for earnings and at the same time remain essentially excluded from the legal system of state.

This vulnerability makes protection necessary for the informal sector workers, which creates incentives for the political parties to cash in on their helplessness for the parties' own political and electoral gains. This shelter can be provided by the party who enjoys de facto political strength in the locality of a worker's neighbourhood of activity. Mostly, this protection is provided by the ruling party when de facto and de jure powers rest in the same hand. But sometimes, in some areas, the opposition is also found to have enough local strength to provide such shelters to the vulnerable. So the political strength necessary to provide such protection to the informal sector workers is the de facto political power, irrespective of whether that coincides with the de jure power at that time. In return, the parties demand political allegiance from the workers, including their votes, participation in political and organizational activities like attendance in party meetings etc, going up to the extent of extortion for party funds, lending muscle power to lead elections etc, which are common political malpractices in L.D.C.s.

4.1.1 Typical Scenario

The motivation of our model may be easier to understand with a typical example. Consider an example of a street vendor who hawks on the streets to sell an item to earn his living. In a more likely scenario, street hawking is restricted and maybe a punishable offence like in most crowded public places. But crowded places itself with higher numbers of potential customers make these businesses more profitable. Apparently there's minimal fixed cost or negligible set up cost for the vendor, but the cost of punishment if caught and penalised can be assumed to be sufficiently high. This makes their livelihood a risky business, and turns them vulnerable towards extortion and exploitation by both the policemen and local goons. In the presence of weak law enforcement, these vendors' illegal activities are often protected by local thugs who are affiliated to one of the political parties. These local strongmen enjoy the power to offer protection from the 'street power' of the affiliating political party. Further, each of these vendors provides protection money to these local thugs to carry out his or her illegal activities (e.g., either to protect themselves from the legal forces or to create an entry barrier for their competitors etc.). These thugs, who are backed by their affiliated political party, very often engage in physical violence to establish their territorial control. Since these vendors and thugs are also the voters, clearly for them the de-facto political strength of their affiliated party does matter for utmost consideration. This very practical phenomenon of daily lives provides the rationale for our framework to interlink political clientelism with violence.

4.1.2 Conceptual Framework

The disparate circumstances in which formal and informal voters function lead to a fundamental difference in their voting behaviour. Formal sector voters are employed in formal sector jobs which are above board and do not require any clandestine political support. Therefore, these voters are free to vote according to their true preferences which reflect personal preferences as well as commonly observable relative performance of rival political parties. Informal sector voters, on the other hand, are compelled to vote for that party which provides them political support. Each informal sector voter, however, is free to choose its protector. She will choose that political party as her protector whom she perceives as more powerful. The perception is formed on the basis of her private signals which are partially influenced by

the extent of violence undertaken by a political party.

Informal sector voters, on the other hand, have a paralegal economic existence. We broadly define the informal sector as one where the rule of law is lacking. In this sector, unregistered economic activities are undertaken, and formal laws of the land – such as labour, environmental and tax laws – are flouted. Similarly, property rights and other legal rights are not well defined and since the legal system is expensive, it is often unaffordable for informal sector voters. All this, taken together, makes informal sector voters vulnerable and manoeuvrable.

To protect themselves from their vulnerability, informal sector voters seek political support. This support is provided by political parties on a quid pro quo basis. In return for political support to the vulnerable, the party providing the support demands complete allegiance, which among other things, requires voting for the party. Therefore, instead of voting according to their true preferences, the informal sector voters are compelled to vote for the party which provides them protection.

The difference in the political behaviour of formal and informal sector voters stems not from any inherent difference in their preferences, but from the disparate position they are situated in.

This idea also takes inspiration from the central thesis of "political society" by Chatterjee (2004), which had a path breaking contribution in political science to understand the political economy of exclusion and the economic life existing out of illegality in postcolonial societies. This pioneering work categorizes the population as *'political society'*[3] and *'civil society'*[4] along the fissures of those living outside or on the borders of legality, in order to target economic benefits and thereby political control. Following this formulation, we model this inherent class antagonism by categorizing into formal and informal sector employment. In our framework, the formal sector employees

[3]The "political society" represents the distinctive existence of an entire population subgroup whose economic livelihood and social life survives on borders of illegality — squatters, street traders, fare-dodgers, etc. This diverse section of the population is likely to get mobilized as a niche constituency of the electorate, couching demands in terms of welfare doles. According to Chatterjee (2004), political society lets 'some of the squalor, ugliness and violence of popular life' into politics.

[4]Juxtaposed to the 'political society' stands the 'civil society', which can be imagined as its organized urban counterpart, comprising those who occupy the powerful positions of influence in the social hierarchy. Within 'civil society', public and economic resources are assumed to be available to all. Examples may include business elites, upper and educated middle class etc.

may be understood to comprise the 'civil society', whereas the workers in the informal sector comprise the 'political society'. The para-legality of the political economy of L.D.C.s forms the root of this class antagonism and consequently the difference in the voters' behaviour.

4.1.3 Clientelism and Violence

The typical scenario of our model pertains to an illustrative example of *political clientelism*.[5] A recent World Development Report (The World Bank, 2017) illustrates the growing acceptance of political clientelism as a viable mode of profitable electoral mobilization with its origin in lack of economic development, weak legal environment and violence (see also Fukuyama, 2011; Mungiu-Pippidi, 2015).[6] A *'natural'* relationship between political clientelism and informal sector has been formally studied by Bardhan and Mukherjee (2017), Bardhan et al. (2006) etc. and its effects on governance by Sarkar (2010, 2018) among others. According to Chatterjee (2004), parties seeking electoral mobilization often face incentives to cultivate and exploit the vulnerability of 'political society' exhibiting a classical feature of political clientelism. As a consequence, strategic temporary arrangements of protection and livelihood are often negotiated with the ruling political dispensation. We argue that presence of large informal sector incentivizes political parties to engage and invest in various forms of extra-constitutional activities; one of them being violence, which is our question of study here. In our model, this objective of political parties investing in force before elections to increase vote shares has been discussed at length by Chaturvedi (2005) in the literature. In our framework, both the incumbent and opposition parties engage in violence to increase vote shares.

Numerous studies and evidence from the economic and political science literature motivate as well as validate the causal mechanism of political clientelism and violence, which is the foundation of our model. An empirical study of electoral violence in gubernatorial elections in Oyo state of Nigeria from 2007 to 2015 by Abebiyi, O. M. (2021) found political clientelism to be a significant factor behind political violence. Latin American countries strongly resemble similar features of political clientelism and violence. Gay

[5]For useful conceptual discussions on clientelism and patronage networks, see Kitschelt and Wilkinson (2007).

[6]A formal literature review of political clientelism was done by Bardhan and Mookherjee (2017).

R. (2012) discusses at length the politics of clientelism and violence in recent experiences of Brazil. Berenschot (2019) offers accounts from India and Indonesia on how political competition incentivizes politicians to foment religious and ethnic violence. He has shown how patronage networks generate both infrastructure and incentives to organize violence, stemming from the everyday functioning of clientelism that generates interdependence between politicians and local followers which facilitates the political organization and violence. This similar reasoning of incentivising violence through clientelism is followed by our paper, with a new focus on informal sector.

4.1.4 Motivating Evidence

Experiences of South Asian democracies in general, and particularly West Bengal in India form the prime motivation for our study. India being the largest democracy of the world and relatively more successful one among the South Asian democracies, offers to be a suitable case for our typical scenario. In India, the rate of violent crimes is not exceptionally significant in comparison to other states (National Crime Records Bureau (N.C.R.B.) reports). But this politically active state has stood out in terms of political violence between the mainstream parties, in spite of seeing negligible caste, communal or insurgent conflict like some other states.

In Bangladesh, another prominent and relatively young South Asian democracy, elections have been held every five years since 1991 (except between 2007 to 2008), with an alteration of power until 2014. Simultaneously, the democratic experience of Bangladesh has seen spikes in political violence before elections. The use of 'muscle politics', regular disruptions to daily life through strikes, curfews and aggressive politics of the streets still forms a characteristic feature of Bangladeshi politics (Khan, 2015).

Pre-election periods of Bangladesh tend to be excessively violent, with data from 1991-2014 showing stark peaks in violence in election years of 1996, 2001, 2006 and 2013 (before the January 2014 elections), with clear post-electoral slumps in violence. As Armed Conflict Location and Event Data Project (A.C.L.E.D., 2018b) finds, the two main political parties of Bangladesh have been at the forefront of such daily political violence. Khan (2015) identifies the reason behind Bangladesh's politically violent democracy as the existence of patron-client networks in its political life. Voters in Bangladesh formulate preferences about candidates based on private distribution of resources (both economic and political), preferring the candidate

who is willing to give them the most private gain rather than by comparing policy platforms or ideological positions. Electoral laws in place have no mechanism to regulate this type of patronage voting. This kind of voter behavior in formulating political preferences with the backdrop of weak legal institutions shapes the structure of this paper's framework.

4.1.5 Summary and Contributions

We propose a one period static framework with two parties competing for elections to win the office. The economy consists of two sectors- formal and informal. The preference and voting behavior of the formal sector workers are different from the informal sector workers. Their voting decisions are based on the overall performance of the parties. As the informal sector workers are more directly dependent on the parties for protection and livelihood, their voting behaviour is strategic. Based on a noisy signal about the relative political strengths, the informal sector voters prefer to side with the party which seems more likely to come to power. This gives rise to a coordination problem. The noisy signal about the relative political strengths helps to solve the problem of multiplicity of equilibria.

We find that resources spent on violence by both the political parties depend only on the costs and not on performances on development. When costs are the same, both parties invest an equal amount of resources on violence. This implies that a better performing party may engage equally into violence like the inferior performer, making the equilibrium highly violent even when both the parties have performed well. This solves the puzzle of why well-performing incumbents engage in high violence in a democracy. t

We find an increase in the size of informal sector employment, clientelistic benefit and the ideological spectrum of the formal sector voters increases political violence, and also increases the winning chances of the poor performer, thereby reducing the chances of the well performing party. A rising competition in the development performance more preferable to the formal sector voters decreases political violence by both the parties, thereby increasing the electoral chances of the better performer in equilibrium.

Elections regulate the allocation of de-jure power in society, but alternative technologies shape the de-facto balance of political forces as well. Even under democracies, powerful political actors face incentives to invest in de-facto power through violence (Acemoglu and Robinson, 2006, 2008). In this paper, we largely follow this stream of theory with a new question- the role

of informal sector.

We study the incentives for the political parties to engage in political violence in *this* context, to better understand the relationship between political violence and informal sector. Our model deals with a general form of political violence, which may be targeted or non-targeted. The instrumental role of violence in our model is to send a signal of political strength to convince the voters of their electoral winnability. In our context, political violence can be interchangeably interpreted as electoral violence as it can be targeted to opposition supporters and voters. Typical scenario of our model does not emphasize violence during electoral times *only*, but increase in the pre-election periods form a major chunk of them. To be specific, violence in our context generally does not refer to coup, repression etc. in the sense of Besley et al QJE etc.[7]

While there are several theories behind political violence in backward economies, we offer another plausible explanation in terms of political clientelism resulting from large informal sector in the backwards economies. This paper has taken the informal sector as one prime indicator of economic backwardness and has tried to establish its causality with political violence in the less developed economies. In a democratic set up, we focus on one possible channel through which economic backwardness affects political violence - the informal sector.

It needs to be made clear to the reader's mind from beginning that in no way the authors claim violence as the *only* tool available to the political parties to send the signal of their political strength to the a section of the population. As violence is the question of our study here- a feature chosen from many other factors in reality for reasons argued above, we focus only on it within our limited context, and model all other possible factors summarily captured by a random variable, as is standard in any theoretical analysis. Specifically, violence is just *one* of the possible ways of determining 'street power', which this paper lays emphasis on for studying, with all other factors assumed to be captured by an independent random variable.

Among the vast literature on economic backwardness and conflict, specific study on informal sector and electoral violence is scarce. To the best of our knowledge, offering a theory on this relationship is the most novel

[7]One important aspect of such violence is the 'negative campaigning' as termed by Skaperdas (1995) in the sense that it alienates the general voters. This has been documented through surveys by Garramone (1984) among others, who has termed it as "boomerang effect". We stay away from modeling this aspect in this paper.

contribution of this paper to the economic literature. Also, taking cue from the political theory of Chatterjee (2004), th difference in voting behaviour of formal and informal sector workers in our model, exhibiting their class antagonism, forms the crux of this paper. Relating the formal economic theory of development to this strand of literature in political science is a first such attempt which also potentially contributes to the novelty of this paper's work.

4.2 Related Literature

Large amount of work has been explored in political science and economics literature on the causes and consequences of political violence. Conflict literature in economics is mostly dominated by studies on war, civil war, ethnic riots etc. The literature on political and electoral violence is smaller comparatively. Two themes emerge from the literature relating conflict and electoral politics; one that considers violence and electoral politics as strategic substitutes and the other as strategic complements (Dunning 2011). Our work is nearer to the latter strand of literature, arguing that electoral incentives shape violence (Kasara, 2009).

As discussed in the literature, political and electoral violence can be of different nature and take different forms. Although electoral violence can be both targeted and non-targeted, it is generally understood to be a subset of political violence, and targeted at opposition voters to force them into abstention. Political violence can be non-targeted, intended to create a general ambience of fear, like discouraging voter turnout etc. Ellman and Wantchekon had termed these as "non-electoral factors". Other forms of non targeted violence like blocking roads, burning tires, picketing, etc. were referred to as "alternative political technologies" by Machado et al. We don't get into such differentiation here in this paper as both can suite the purpose of signaling political strength.

Rauschenbach et al. (2019) offered a first systematic cross-national analysis of clientelism and voter intimidation in seven African countries and find that voters living in incumbent strongholds are most likely to receive clientelist benefits before elections, whereas those living in opposition strongholds are most vulnerable to violent intimidation. Moncada (2016) in his exploration of the exclusionary political order of Cambodia identifies the use of violence as an extension of political competition in explaining the contempo-

rary politics of urban violence. Forster (2018) conducted an empirical study on Africa to find a consistently positive and statistically significant relationship of political violence with post-election violence. They offered a theory claiming that clientelism increases risk of electoral violence and empirically found the condition of an Incumbent running for the office as a prerequisite for this theory to hold. Our model assumptions in this paper are similar to both their theoretical assumption of clientelism driving electoral violence and the empirical finding that an incumbent party fights aggressively seeking a reelection to the office.

One strand of literature claims that violence is predominantly a tool of the opposition or the politically weak ((Skaperdas and Grofman, Chaturvedi, Wanwchekon, Ellman and Wantchekon, Collier, Wantchekon, Ellman and Wantchekon etc.). However, much of the empirical literature claim that a lot of violence is undertaken by the incumbent, state, and the electorally stronger party too (Strauss and Taylor). A UNDP study worldwide had found pre-electorally a whooping 81 percent and post-electorally about 60 percent of violence is indicted by the ruling party. Our paper also attempts to explain this feature of well performing incumbents engaging into higher violence.

There is little or no theoretical economic literature on relationship of political violence with informal economy to the best of our knowledge. Empirical literature relating political violence with informal economy is scarce. In a recent work, Jawadi et al. (2021) using data from France and the UK over the time period 1975Q1 to 2013Q4 and 1983Q1 to 2018Q2, Jawadi et al. 2021 find a robust connection between unemployment and both violent and non-violent crimes. A field survey in Karachi, Pakistan by Cardiff University (2017) found that violence increases the size of informal workforce, increases their harassment and various kinds of abuse and vulnerabilities. On the other hand, an empirical study on Bangladesh (Chowdhury 2005) provide evidence how informal economy increases political violence and corruption. The present work can be thought of as an immediate extension of Sarkar (2010 and 2018), adding the new dimension of political violence.

Our formal model of electoral competition fits into literature of strategic voting using Global Games- (Carlsson and vanDamme (1993), Morris and Shin (1998)) Global Games are a type of coordination games used in macroeconomic problems like currency attacks (Calvo 1988, Obstfeld 1986,1997, Cole and Kehoe 2000 etc.) and microeconomic problems like protests and revolution, strategic voting etc. (Mesquita 2003, Angeletos et al. 2007, Shad-

mehr and Bernhardt 2011, Edmond 2013). Taking cue from Sarkar (2018), our present model follows that framework of clientelist politics using global games.

4.3 Theoretical Framework

We consider a static model with a bi-party electoral democracy, where two parties viz. Party A and Party B compete against each other for winning elections. The gain from holding office is normalized to 1. The economy consists of two sectors- formal sector and the informal sector.

Total population in the society are assumed to be all employed, either in the formal or in the informal sector. The size of population working in the formal sector is normalized to 1. The relative size of the population in the informal sector is denoted by n, which can be less than, equal to or greater than 1.

The formal and the informal sector agents take their voting decisions differently, based on different parameters and policies. The over all performance of the parties is important to the formal sector voters. This performance can be economic, for a long term development etc, which matters more to the formal sector voters. Without loss of generality, we assume party B to have performed better than A. Unlike the formal sector voters, informal sector voters only observe the de facto *political strength* as it determines their survival in an informal and semi-legal economy.

Two political parties A and B are purely office seekers, and their objective is to maximize the probability of their electoral victory for the office. The fixed benefit from office is assumed to be unity for both the parties. Electoral victory depends on their performances and political strength. Formal sector voters' support is based the parties' performances and their own personal preferences, where as informal sector voters support on the basis of their political strength. We carry our analysis with respect to party A, assuming party A's performance to be worse than B. The optimal choices of Party B can be derived consequently. The choice variables for the parties A and B are v_A and v_B respectively, which can take any non negative value. They denote the amount of resources spent on physical violence incurred by the respective parties against their political opponents.

We imagine the de facto political strengths as a function of violent *contests* between the parties, along with other exogenous random factors in a simplest

additive form.

The objective of the political parties in engaging into electoral violence against each other is to send a signal to the informal sector voters about its political strength. The show of political strength helps in convincing voters about their winnability. Party A's *relative political strength* is defined by

$$P_A = v_A - v_B + \xi \tag{4.1}$$

where ξ follows a bell-shaped distribution $F(\xi)$ with $E(\xi) = 0$, $V(\xi) = 1$ and $f' < 0$. The variable ξ denotes other non-violent sources of political strength, which are random.

This formulation of political strengths is in accordance with the *Relative Difference Contest-Success Functions*, first proposed by Hirshleifer (1989), which is a very standard assumption in the conflict literature.[8] The cost of incurring violence is given by the function $c_I(.)$ with $c_I' > 0$, $c_I(0) = 0$ and $c_I'' = c'' > 0$ for $I \in \{A, B]\}$.

The over-all performance of Party A among the formal sector voters is captured by Γ_A, which can take any real value. Similarly, Γ_B captures Party B's performance. These performances can be interpreted as efforts for development and related economic performance in particular. Without Loss of Generality (W.L.G.), we assume

$$\Gamma_B \geq \Gamma_A \tag{4.2}$$

A representative formal sector voter votes for Party A if and only if

$$\Gamma_A + \eta \geq \Gamma_B \tag{4.3}$$

where η denotes the agent's personal preference or dislike for Party A. This random variable captures the relative popularity of the voters for party A that stem from all non-economic dimensions like identity, social issues, any non-economic preferences or idiosyncratic shocks etc. The η follows Uniform Distribution over the domain $[-\frac{\epsilon}{2}, \frac{\epsilon}{2}]$. This follows from the standard probabilistic voting framework.

Hence, the size of formal sector voters supporting Part A is given by

$$\Pi_A = P(\Gamma_A + \eta \geq \Gamma_B) = \frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon} \tag{4.4}$$

[8]For a detailed discussion see Beviá, C.et al. 2015

Therefore, the size of formal sector voters supporting Party B can be derived as

$$\Pi_B = 1 - \Pi_A \tag{4.5}$$

In a largely populated society, an informal sector voter observes a noisy signal s about the political strength P_A of Party A. The noise is created by imperfect observations of the de facto political strength P_A by the informal sector workers. The signal s is distributed uniformly over the domain $[P_A - \frac{1}{2}, P_A + \frac{1}{2}]$. An informal sector voter, after observing her signal, infers the expected value of Party A's political strength as

$$E(P_A|s) = \int_{s-\frac{1}{2}}^{s+\frac{1}{2}} P_A dP_A = s \tag{4.6}$$

She gets a *future private benefit* of $b > 0$ from voting the winner. There is no benefit from voting the loser. There is a *relative current benefit* from supporting Party A which depends on its political strength, and is determined by zP_A. Conceptually, this relative current benefit is proportional to the relative political strength, and the positive constant z is the relative factor of proportion of Party A with respect to B. It represents the capacity of Party A in turning its political strength into delivering exclusive benefits to each individual supporters, net of Party B. Thus, z can be interpreted as party A's capacity to deliver *relative clientelist* benefits with respect to Party B and zP_A as the *net* clientelist benefit of supporting Party A currently, relative to B.

Note that, more the political strength, larger is the current benefit. So for a negative P_A, there can be a current loss from supporting party A.

Both the pay-offs b and z can include clientelist benefits as they're offered in exchange of political allegiance by the patron political party. For b the patron is the ruling party which can be wither A or B, and for z the patron is party A.

The variable b is the individual benefit that a ruling party can provide, like shelter or help in any kind of employment which is semi legal in nature and needs protection from the law enforcement personnels or institutions. Examples of b can be various welfare schemes by the Government which can be provided exclusively to individuals. Only a party in office controls these law enforcement machineries to be able to provide such benefits.

The benefit can also include any future scope of employment in the public sector, which is controlled by the Government and hence only the ruling parties can provide.

The variable z is the exclusionary individualistic relative benefit that can be provided by party A in excess of or relative to the private benefit provided by B. The z can be cash or kind like shelter, protections etc. This comes from the relative de facto political strength of the party A, i.e. the relative street or muscle power of A. This kind of political power is independent of the de jure political strength i.e. the political power that arises from holding the office. The capacity to provide this benefit doesn't come by the virtue of holding the office of the Government but from the political street power of the parties.

These two kinds of benefits b and z differ in the sense that the capacity to deliver them derive from two completely different sources- one from the office of the Government whereas another from the de-facto political strength or 'street power'.

The sequence of events is as follows:

1. In the beginning, the performance of party A and B, i.e. Γ_A and Γ_B respectively, are chosen by Nature. The formal sector voters take their voting decision based on the party's performance and their own individual preferences.

2. The two parties engage in political violence by choosing v_A and v_B simultaneously.

3. The ξ is realized. Hence its political strength P_A is realized.

4. Informal sector voters observe a noisy signal about the political strength of the parties. They infer the expected political strengths of the parties from their observed signal.

5. Informal sector voters pledge their support for one of the parties and take their voting decisions accordingly.

6. Elections take place. Pay offs are realized. The game ends.

In the next section, we compute the equilibrium of this co-ordination game.

4.3.1 Equilibrium

First we compute the size of support of the respective parties from the formal sector. A representative informal sector voter knows the voting behavior of formal and other informal sector voters. She starts with a belief $\tilde{s}$ about other informal sector voters on the political strength of Party A. She believes that if any other informal sector voter like her has received a signal at least as large as $\tilde{s}$, then she will support and vote for Party A.

Then, given her belief-signal $\tilde{s}$, she calculates her best response signal $\hat{s}$ to $\tilde{s}$. In equilibrium, every informal sector voter will have the same best response signal $\hat{s}$ used as a cut-off signal for best response strategy. We denote this symmetric best response threshold signal in equilibrium by s^* such that $s^* = \tilde{s} = \hat{s}$. After obtaining the equilibrium best response threshold signal s^* and the corresponding political strength P_A^*, we can find the winning probability of Party A and Party B correspondingly. Lastly, we calculate the optimal choices of violence v_A^* and v_B^* respectively.

We proceed to solve the equilibrium as follows.

After receiving a signal s and inferring about the true political strength P_A of Party A, the representative informal sector voter believes that the condition for winning of Party A is

$$\Pi_A + nP(s \geq \tilde{s}) \geq \frac{n+1}{2} \tag{4.7}$$

which reduces to

$$\frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon} + n(P_A + \frac{1}{2} - \tilde{s}) \geq \frac{n+1}{2} \tag{4.8}$$

Let equality hold for $P_A = \hat{P_A}$. Hence Party A will be just able to win when

$$\frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon} + n(\hat{P_A} + \frac{1}{2} - \tilde{s}) = \frac{n+1}{2} \tag{4.9}$$

Thus, probability of A's electoral victory becomes

$$\pi_A = P(P_A \geq \hat{P_A}) = \int_{\hat{P_A}}^{s+\frac{1}{2}} \frac{1}{(s+\frac{1}{2}) - (s-\frac{1}{2})} dP_A = s + \frac{1}{2} - \hat{P_A} \tag{4.10}$$

Consequently, probability of B's electoral victory becomes

$$\pi_B = P(P_A < \hat{P_A}) = \frac{1}{2} - s + \hat{P_A} \tag{4.11}$$

Now she will calculate her Best Response $\hat{s}(\tilde{s})$. Her expected benefit from supporting A is

$$b\pi_A + zP_A$$

where as from supporting B is $b\pi_B$, where zP_A is relative benefit of supporting A. She will be just indifferent between supporting A and B when the benefits are equal. Based on her Best-Response signal $\hat{s}$, she calculates her expected benefit from supporting A and B at the margin, which by using 4.10 and 4.11 reduces the equality condition to

$$bP(P_A \geq \hat{P_A}) + z\hat{s} = bP(P_A < \hat{P_A}) \tag{4.12}$$

where she estimates P_A by $\hat{s}$ from 4.6.

In the symmetric equilibrium, every informal sector voter will have the same best response signal s^* such that $s^* = \tilde{s} = \hat{s}$. We solve equilibrium signal s^* and the corresponding political strength P_A^* from the above two equations, as

$$P_A^* = (\frac{\Gamma_B - \Gamma_A}{n\epsilon})(1 + \frac{2b}{z}) \tag{4.13}$$

The assumption of $\Gamma_B > \Gamma_A$ keeps P_A^* non-negative. This P_A^* is the crucial variable which we will use in our subsequent analysis to solve the optimal choices of the parties. We formalize it in the following Lemma.

Lemma 4 *The minimum political strength required for the under-performing Party A to win an election is a non-negative threshold value P_A^*. The relative political strength of party A with respect to party B exceeding P_A^* provides a sufficient condition for A's victory in the elections.*

Hence, using *Lemma 1* the objective of Party A becomes maximizing

$$P(P_A \geq P_A^*) - c_A(v_A) \tag{4.14}$$

and that of B is

$$P(P_A < P_A^*) - c_B(v_B) \tag{4.15}$$

w.r.t their choice variables v_A and v_B respectively. The F.O.C.s of Party A and B are:

$$f(P_A^* - v_A + v_B) = c_A'(v_A) \tag{4.16}$$

and

$$f(P_A^* - v_A + v_B) = c_B'(v_B) \tag{4.17}$$

respectively.

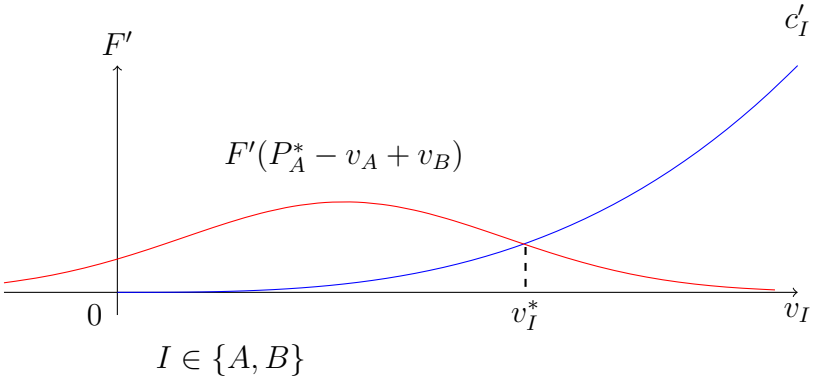
The S.O.C. is satisfied for $-c'' < f' < c''$. To ensure the existence of an *interior* equilibrium, we assume

$$-c'' < f' < 0 \tag{4.18}$$

.

These optimal choices of v_A^* and v_B^*, chosen simultaneously by parties A and B, constitute a Nash equilibrium. Thus, in Nash equilibrium, both parties will choose equal amount of violence when they have same costs, irrespective of their popularity among the formal sector voters.

Note that there can be two possible equilibria, because the marginal cost curve can intersect the PDF curve F' either somewhere at $f' > 0$ or somewhere at $f' < 0$. The former case signifies a higher cost of incurring violence than the latter. In our framework, it's reasonable to assume incurring violence is relatively less costlier than ideal. Our entire premise is based on a semi legal environment with weak enforcement of legal institutions. Hence we assume $f' < 0$ around the equilibrium, i.e. the cost of incurring violence by political parties is relatively cheaper to make our case realistic. This automatically rules out the possibility of multiple equilibria. Moreover, any further doubt regarding the uniqueness of equilibrium doesn't arise due to the assumption of strict monotonicity of the cost function.



Optimal Choice for Party I

We present the results in the following section.

4.3.2 Results

It is straightforward to see from 4.16 and 4.17 that the choice of violence by each of the parties depends on their individual costs. If we assume the cost functions to be same for simpler comparability, we find the well performing party B engaging in as much violence as the worse performer A in the equilibrium. Thus, if B has lower costs than A, it may engage more into violence in spite of its better performance and vice versa. We formalise this finding below and discuss its implications.

Proposition 9 *In equilibrium, the choice of violence by the political parties depends only on their individual marginal costs of incurring violence and not on their performances on development. When costs of violence are same for the parties, both inflict equal level of violence in the equilibrium, i.e.* $v_A^* = v_B^*$.

The intuition behind this result comes from the presence of informal sector voters in our model to whom economic performance does not matter. Thus, economic performance alone cannot ensure an electoral victory for the better performer, which drives this result.

The result implies that even if two parties have performed well on development, the equilibrium can be highly violent. The most significant implication of this result is that, it establishes how a competitive electoral democracy with high informal economy may simultaneously witness high political violence *in spite of* high developmental work by the parties. This is relatable to the experiences of many South Asian democracies with high incidence of political violence, even during their years of high economic growth and development.

In experiences from real life, its more likely that bigger political parties have better access to more funds and hence their costs of incurring violence is relatively lower. Thus, another possible implication of this result is that, larger parties, although being more popular, may indulge in higher violence compared to the smaller parties.

Specifically, ruling parties, having control over state instruments can avoid legal consequences of incurring violence with relative ease. They can also have higher access to funds as rents from office in a corrupt state, or they can use the state-power as a threatening tool for extortion and collecting funds. Hence, the Incumbent party is often found to engage more into

electoral violence.[9] Therefore, most interestingly, 4.3.2 solves the puzzle of why well performing *incumbents* still engage into high political violence, in spite of higher chances of electoral victory. We summarize it in the Corollary below:

Corollary 4.3.1 *A better performing party may engage equally into violence like the worse performer. Even when both the parties have performed well, the equilibrium can be highly violent.*

For elaborate evidence, West Bengal can be a test case in support of this finding.

Supporting Evidence from Bengal

As per the National Crime Records Bureau (N.C.R.B.) of India data, a total of 29 political party members were killed in the 2018 rural local body (Panchayat) elections, whereas the 2013 Panchayat elections led to the death of 39 people. In 2009 Lok Sabha elections, out of the total 5,315 poll-time offences registered in India, 18 per cent were in West Bengal. During the 2014 Lok Sabha elections, of the 16 political workers killed across India in poll-related violence, 44 percent of them were in West Bengal. In a similar manner, data for 2019 also shows that of the 2,008 political workers who were injured, 1,298 (that is 64 percent) were in West Bengal.

The global non-profit research organization Armed Conflict Location and Event Data Project (A.C.L.E.D., 2018a) gathered evidence of political violence in the rural local body elections of West Bengal of 2018 from newspapers and media reports. Their analysis claims that the political violence seemingly benefited the popular incumbent as opposition candidates failed to put up any candidate in over 34 percent of seats across all districts of the state. During the initial phase of the filing of nomination papers (due on April 9), reported violence and associated fatalities were considerably higher than weeks prior- over 10 times as many events reported and twice as many reported fatalities relative to the week prior. They find that over half of the election-related violence took place in those districts which had the highest proportion of uncontested seats, (viz. Murshidabad, South 24 Parganas, Hooghly, Bankura, Purba Bardhaman, Paschim Bardhaman and Birbhum).

[9] A detailed discussion of incumbents indulging into violence can be found at Hafner-Burton et al. 2018

Despite such high levels of violence, police intervention was only reported in 4 percent of events, demonstrating a stark underemployment of the state security apparatus by the incumbent in the office of the state administration which conducts these local body elections.

As the incumbent party got popular victory across all the districts of the state (38118 village bodies (Gram Panchayats) versus 5779 by the first runner up, 8062 local governments (Panchayat Samitis) versus 769 of the highest rival and 793 district bodies (Zilla Parishads) versus 22 of the main opponent)[10] these all indicate towards a popular incumbent party engaging in high political violence in spite of its popularity among the electorate.

But percentage rise in uncontested seats in rural local body elections of Bengal is not a recent phenomenon. Past data over four decades from Bengal's State Election Commission shows an unnatural increase in the number of uncontested seats in local body elections twice- from 0.74 percent in 1983 to 8 percent in1988, and from 1.36 percent in 1998 to 11 percent in 2003. These past decades were simultaneously experienced by widespread allegations and media reports on political violence, especially from rural Bengal. Interestingly, in the entire period of 1977-2011, the ruling party enjoyed uninterrupted rule of office from popular mandate in elections as well as high political violence. Chatterjee (2011) has discussed at length the dole politics, party power and political violence in Bengal during this period.

Another distinct feature of violent Bengal politics is that unlike in other states of India where electoral violence is recorded mostly before and on the polling day, in West Bengal more instances of violence are observed in the period after polls are held. All-India National Crime Records Bureau (N.C.R.B.) data shows that across the country 65 percent and 74 percent of violent events were recorded in the pre-election period of 2009 and 2014 Lok Sabha general elections respectively. But for West Bengal alone, the election period offences recorded after voting was over 61 per cent during the 2009 elections and 44.68 per cent for 2014 elections.

After the announcement of results of the recent 2021 West Bengal Legislative Assembly election too, allegations of widespread political violence broke out in West Bengal reportedly causing at least eleven deaths from both the ruling and the opposition parties. The extent and severity of post poll violence can arguably be considered a reasonable indicator of political polarization. These regular periodic features collectively indicate towards a

[10]Source: West Bengal State Election Commission

phenomenon of political violence which is impossible without the Incumbent being tacitly or overtly complicit with.

Next, we move on to our main findings on the informal sector. By totally differentiating 4.16 and 4.17 and some simple algebra gives

$$\frac{\partial v_A^*}{\partial n} = \frac{\partial v_B^*}{\partial n} = \frac{\partial P_A^*}{\partial n} \frac{f'}{c''} \tag{4.19}$$

It is easy to check $\frac{\partial P_A^*}{\partial n} < 0$. This, along with 4.18 implies $\frac{\partial v_A^*}{\partial n} = \frac{\partial v_B^*}{\partial n} > 0$, which brings us to the following proposition:

Proposition 10 *An increase in relative size of informal sector employment n in the economy increases the equilibrium level of violence v_A^* and v_B^* in the polity, without changing the equilibrium condition of $v_A^* = v_B^*$. Thus, with a positive level shift in the equilibrium choices v_A^* and v_B^*, a higher violence by both the parties constitute a more violent equilibrium, resulting from a relative rise of informal employment in the economy.*

This result readily follows from the Envelope Theorem. It formally establishes the relationship between political violence and informal sector, which is the primary finding of our question in this paper. It is the most important finding of this paper, specifically contributing to the growing literature of clientelism, but also to the broad literature of political violence and development. The following results in the rest of the paper take a cue from this result.

Empirical Evidence from India

As this result can be understood as one of the chief contributions of this paper, we perform some simple empirical exercises to build evidence in support of this result. Although correlation doesn't imply causality, it vindicates the essence of this paper to some extent, justifying the direction of our argument.

Data

Informal Sector data in India is collected in every round of the labour force surveys of National Statistical Office (NSO), currently called the Periodic

Labour Force Survey (PLFS). We use the 'PLFS Annual Report 2019-2020' for statewide data. As per their clear definition of informal sector in the report, we take the percentage variable of 'usually working (ps+ss) persons' in industry-type 'proprietary and partnership' in each state as the measure of its informal sector.

The National Crime Records Bureau (N.C.R.B.) is an Indian government agency responsible for collecting and analysing crime data as defined by the Indian Penal Code (IPC) and Special and Local Laws (SLL).

Correlation

Calculating the **Spearman's Rank Correlation Coefficient** between the percentage of informal sector workers and each of the political crime rate and percentage of political murders gives us the values of 0.6 and 0.56 respectively, which are a quite strong indication of association between informal sector employment and political violence in India. This is a major motivation in support of our main result.

Next, let us denote the equilibrium probability of A and B's electoral victory by π_A^* and π_B^* respectively. Like before, it is easy to check from 4.19 that $\frac{\partial \pi_A^*}{\partial n} > 0$ and $\frac{\partial \pi_B^*}{\partial n} < 0$. This reaches us to the significance of a large informal economy for the development and quality of governance in a democracy. The result follows:

Proposition 11 *A relative rise in the informal sector employment n increases the chances of electoral victory $P(P_A \geq P_A^*)$ of the poorly performing party A and reduces the electoral chances of the well performing party B in the equilibrium.*

The intuition behind this result lies in the possibility that the party with relatively poorer performance may manage to win an election with the support of large number of informal sector workers. The factor driving this result will be clear from observing the increase in the relative weightage of the informal sector in the parties' re-election function, i.e. their objective functions. As this is a one period model, a rise in the informal sector's relative weight in the objective function is increasing each of the parties' investments in violence simultaneously before anything else, dominating all other potential factors.

This result is significant for studying the implication of a high informal sector on the quality of democracy of a poor country. A growing informal sector may be detrimental for the over all development of economy too, where the party with worse over all and economic performance may find winning an election *easier*, by compensating the performance deficit through violence, attracting support of the large number of informal sector workers.

This result *reinforces* the result of Sarkar (2018) that large informal sector with clientelistic characteristics in less affluent countries has a positive relationship with sub optimal performances of political parties.

Next, we look at the mechanism with which the under-performing party A earns the support of the informal sector workers, which is the relative clientelist benefit z. We find $\frac{\partial P_A^*}{\partial z} < 0$ and a calculation like before gives $\frac{\partial v_A^*}{\partial z} = \frac{\partial v_B^*}{\partial z} > 0$ under our assumption 4.18. Also. $\frac{\partial \pi_A^*}{\partial z} = -f.\frac{\partial P_A^*}{\partial z} > 0$ and $\frac{\partial \pi_B^*}{\partial z} = f.\frac{\partial P_A^*}{\partial z} < 0$. We present these findings below.

Proposition 12 *A higher capacity of delivering exclusive clientelist benefit z by the inferior performer increases the choices of violence by both the parties in equilibrium. It also increases the winning probability of the low-performing party, decreasing the chances of the better performer.*

When incurring violence is less costly for the better performer, it gains more political strength than the inferior, there by reversing the above.

Thus, greater scope of clientelism leads to higher political violence and lower development in equilibrium.

Similar mechanism like in the previous result is at play here. Increase in the relative weightage of the informal sector is dominating all other factors.

As z is the capacity of A's turning its advantage in political strength over B into clientelist benefit for supporting A, its positive effect on A's winning chances, and consequently negative effect on the rival B's electoral chances are intuitive. But interestingly, it not only raises the choice of violence by A alone. As a result of increasing violence of A, B also raises it's choice of violence in the equilibrium. Thus, clientelism raises the choice of violence by the well-performing party too. In its implication for development, this result is also in similar spirit with that of Sarkar 2018. But it contributes more by adding the dimension of violence, explaining its relationship with clientelism.

Now, we turn to the relative performance of the parties in the formal sector $\Gamma = \Gamma_B - \Gamma_A$. A higher Γ means less competition between the parties among the informal sector voters and vice versa. The competition can be over economic and other performances, political popularity etc. or all taken together. Like before, we derive $\frac{\partial P_A^*}{\partial \Gamma} > 0$ and therefore, $\frac{\partial v_A^*}{\partial \Gamma} = \frac{\partial v_B^*}{\partial \Gamma} < 0$ and $\frac{\partial \pi_A^*}{\partial \Gamma} < 0$, $\frac{\partial \pi_B^*}{\partial \Gamma} > 0$. The proposition follows.

Proposition 13 *A rising competition in the performances preferred by formal sector voters ($\Gamma = \Gamma_B - \Gamma_A$) decreases political violence by both the parties, there by increasing the electoral chances of the better performer in equilibrium.*

There are two possible intuitions to explain this result. When winning chances of the lower-performing party among the formal sector voters Γ_A further declines, it doesn't attempt to compensate for it by gaining support of the informal sector by incurring more violence. This is because, a higher Γ increases P_A^*, there by increasing the cost of engaging into more violence in equilibrium. Consequently, this also lowers the violence of its opponent. Similarly, when performance of the better-performing party B improves more, i.e Γ_B increases, it refrains from indulging into more violence as it doesn't need to, consequently resulting in a peaceful equilibrium.

Lastly, we interpret ϵ to be the ideological spectrum of the formal sector voters, which captures the relative popularity of party A with respect to to all non-economic factors like ideology, identity, or any idiosyncratic shock generated by non-economic factors. It is easy to check that $\frac{\partial P_A^*}{\partial \epsilon} < 0$ and hence $\frac{\partial \pi_A^*}{\partial \epsilon} > 0$, $\frac{\partial \pi_B^*}{\partial \epsilon} < 0$. Finally, $\frac{\partial v_A^*}{\partial \epsilon} = \frac{\partial v_B^*}{\partial \epsilon} > 0$. We conclude this section with proposition below:

Proposition 14 *An increase in the ideological spectrum ϵ of the formal sector voters increases the electoral prospects of the under performer and leads to a more violent equilibrium.*

As the ideological spectrum ϵ stems from ideological as well as other exogenous factors or shocks relevant to the formal sector voters only, its expansion increases the uncertainty of the formal sector voters' support for the parties. This is followed by higher political signaling by the parties to

the informal sector voters, the instrument for which is violence. As a result, it helps the electoral prospects of the under performing party A. This is intuition of the mechanism drives this result.

4.4 Discussion of Baseline Model

It's important to understand that the costs incurred by the parties for spending resources in violence cannot be interpreted as campaign costs as standard in the literature.

Our model features two parties competing over signalling their respective political strength. A section of voters watch their strength to guess their performance capacities for delivering clientelist benefits. So the voters' individual gain from voting the better performer lies in that party's winnability, stemming from the fact that capacity of providing clientelist benefits are higher for the party running the office. But in standard campaign costs, this winnability is not a factor that is considered. Hence the cost incurred on resources spent with the objective of signaling winnability through the mechanism of violence doesn't qualify as standard campaign costs in the literature. The idea behind standard campaign costs used in the literature is completely different from what we have modeled as the costs of incurring violence.

Secondly, campaigns costs are not interdependent, but the variables of our model concerned here form the contest-success function, generating and capturing a completely different phenomenon altogether.

Thirdly, campaigns have no relation with delivering current benefits. But our variables of cost concerned here directly determine the relative capacity of delivering clientelist benefits.

Thus both conceptually and technically the cost variables in our model do not resemble or qualify to be the campaign costs as standard in the voting literature.

Political clientelism generates various strands of employment for those engaged in the acts of violence with political motives. The act of political support includes organising the violent activities of muscle politics. This task of engaging in violence along with other organisational activities like attendance in party meetings, physical demonstrations and campaigns, other show of strength at street politics like muscle politics and violence etc are played by the informal sector workers. Participation in violent activities generate

direct employment whereas participation in street hooliganism and thug activities generate indirect employment through the extortionary incomes etc. When the party they're aligned with comes to power, these indirect benefits increase via greater capacities of delivering these political clientelist benefits. The future scope of employment, both informal and public sector jobs, also remains higher when aligned with the party controlling the office of Government.

In our model, we had implicitly assumed that the small number of unemployed people play the same role as the informal sector workers because of their unemployment status.

Moreover, we can argue that the people who would have remained otherwise unemployed get involved into such activities including political violence in order to get employment in the informal sector in exchange. Various kinds of payments, in cash or kind, to these members are captured in the cost function of violence. Any unemployed citizen has the incentive to get some kind of employment in the formal sector through pledging political support to the politically powerful.

Lastly, the term 'signalling' is used here not to differentiate among the type of political parties per se, but their behaviour of sending a message to the voters. The political parties are differentiated by their de facto political strengths or street power and their capacity to deliver clientelist benefits, which in turn depends on their muscle power of street politics. The parties are signalling their muscle power aka de facto political strength which can potentially provide higher private clientelist benefits. In our framework they differ in their capacities in delivering clientelist benefits. There's no a priori difference between the parties otherwise.

4.5 Extension: Adverse Effects of Violence

A natural extension of our baseline framework is to model the adverse effects of violence on other stakeholders of the economy. Till now, we had assumed only a signalling role of violence, without any negative externalities. The voters' preference did not incorporate distaste for violence, which is unnatural in reality. We now change this assumption to make the model more realistic.

In the model, as violence is an instrument to signal de-facto political strength towards informal sector workers, it plays an *informative role* for the informal

sector voters. Their decision to ally with the politically powerful to support own livelihood comes through this violence. We assume that this need for economic survival dominates their distaste towards violence. But the same is not true for the formal sector workers, and they can *afford* to express their hatred for violence through their voting decisions.

Like before, the formal sector voters in our model observe the parties' performances in the economy and polity for choosing the winner. Additionally now, they also observe the relative violence by the parties and do not vote for the party which engages in *sufficiently higher* violence than its rival. Specifically, they also observe the noisy signal s about P_A now and infer the true state of P_A. As P_A is determined by the relative investment on resources on violence with respect to A, a high *enough* P_A implies far greater investment on violent activities by A than B. Their distaste for violence will make them not to support A finding upon a high *enough* P_A, *irrespective* of their performances in the formal sector. We assume that a formal sector worker doesn't vote for A if she infers P_A to be higher than $\bar{v}$. The exogenous threshold value $\bar{v}$ denotes the upper limit of their tolerance for violence inflicted by a party over the other. The citizens working in the formal sector know that violence is the chief instrument of gaining de-facto political strength, and do not tolerate it beyond a limit. For informal sector workers, the earlier argued assumption prevails that their distaste and potential costs from violence is surpassed by the potential benefits of protection of livelihood and economic survival, which is the key assumption of our model. They simply cannot afford to express any distaste for violence, as necessitated by their economic helplessness.

With all prevailing assumptions and sequence of events remaining same like before, we begin to solve the equilibrium exactly like before. We calculate the relative size of formal sector workers voting for party A now as

$$P(s < \bar{v})\Pi_A = (\bar{v} - P_A + \frac{1}{2})(\frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon}) \tag{4.20}$$

These are the voters who will vote for A after *independently* looking at *both* the developmental performances *and* resources spent on violence by the parties.

Thus, adding the prospective vote shares from the formal and informal

sector workers, the winning condition for A now becomes

$$(\bar{v} - P_A + \frac{1}{2})(\frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon}) + n(P_A + \frac{1}{2} - \hat{s}) \geq \frac{n+1}{2} \tag{4.21}$$

where the second term of the L.H.S. gives prospective vote share from the informal sector workers like before.

We assume the equality above to hold for ${P_A}'$ so as

$$(\bar{v} - P'_A + \frac{1}{2})(\frac{1}{2} + \frac{\Gamma_A - \Gamma_B}{\epsilon}) + n(P'_A + \frac{1}{2} - \hat{s}) = \frac{n+1}{2} \tag{4.22}$$

.

Next, in similarity with 4.3.1, an informal sector worker will calculate her best-response signal s' for voting for A from the cost benefit analysis from

$$bP(P_A \geq P'_A) + zs' = bP(P_A < P'_A) \tag{4.23}$$

From the above we can solve the best response signal as

$$s' = \frac{2bP'_A}{2b+z} \tag{4.24}$$

As in the symmetric equilibrium $\hat{s} = s'$, we here denote the best response threshold signal for any informal sector worker for voting A by s^{**} and the corresponding political strength for A to win the election by ${P_A}^{**}$. Substituting s' from above in 4.22 we can solve for s^{**} and hence ${P_A}^{**}$ as

$$P_A^{**} = \frac{\frac{\Gamma}{\epsilon}(\frac{1}{2} + \bar{v}) + \frac{1}{2}(\frac{1}{2} - \bar{v})}{\frac{\Gamma}{\epsilon} + \frac{nz}{2b+z} - \frac{1}{2}} \tag{4.25}$$

where $\Gamma = \Gamma_B - \Gamma_A$ defined earlier. WE formalize this threshold political strength in equilibrium to use it in our subsequent analysis.

Lemma 5 *Under the risk of adverse effect of violence on formal sector voters, the minimum political strength required for the under-performing Party A to win an election is a non-negative threshold value ${P_A}^{**}$. The relative political strength of party A with respect to party B exceeding ${P_A}^{**}$ provides a sufficient condition for A's victory in the elections.*

Now, using *Lemma 2* the objective of Party A modifies to maximizing

$$P(P_A \geq P_A^{**}) - c_A(v_A) \tag{4.26}$$

and that of B is

$$P(P_A < P_A^{**}) - c_B(v_B) \tag{4.27}$$

w.r.t their choice variables v_A and v_B respectively. We denote their equilibrium choices by v_A^{**} and v_B^{**} respectively. The characteristics of the equilibrium choices are same like that of the previous section.

A number of observations are in order.

We find that the rising effect of informal sector employment on political violence remains same like before. But unlike before, we now find $\frac{\partial P_A^{**}}{\partial \Gamma} > 0$ only for $n > n_0$ and vice versa, where $n_0 = (1 + \frac{\frac{1}{2}-\bar{v}}{\frac{1}{2}+\bar{v}})(\frac{1}{2} + \frac{b}{z})$. Proceeding similarly like in the earlier section, it follows that $\frac{\partial v_A^{**}}{\partial \Gamma} = \frac{\partial v_B^{**}}{\partial \Gamma} < 0$ and $\frac{\partial \pi_A^{**}}{\partial \Gamma} < 0$, $\frac{\partial \pi_B^{**}}{\partial \Gamma} > 0$ for $n > n_0$ and vice versa, with $\pi_A^{**} = P(P_A \geq P_A^{**})$ and $\pi_B^{**} = P(P_A < P_A^{**})$ denoting the winning probabilities of the respective parties.

This implies that when competition between the parties among the formal sector voters gets close, the under-performer then only engages in violence.

Proposition 15

Under the risk of adverse effect of violence on formal sector voters, when performances of the parties on development are close (Γ falls) and competition for support among the formal sector voters increases, political violence increases if only the presence of informal sector is sufficiently high ($n > n_0$). Otherwise, a smaller presence of informal sector ($n < n_0$) decreases violence in the equilibrium.

Consequently, a close competition in the formal sector (low Γ) in the presence of a large informal sector ($n > n_0$) increases the winning chances of the lower performing party in equilibrium.

The intuition behind this result is comprehensible. When competition for support among the formal sector voters increases, the lower performer A takes the risk of indulging into more violence to signal the informal sector voters for compensating its lagging performance on development. A sizable

presence of the informal sector makes this risk worthwhile in its cost benefit analysis, as a higher size can compensate for the additional support lost among some formal sector voters for the violence. Hence, the size of informal sector is crucial for the electoral victories of under-performing parties and perpetuation of political violence.

4.6 Policy Suggestion and Conclusion

The main policy suggestion of this work points to the direction of reducing the size of informal employment in the unorganized sector as a significant instrument to control political violence and improve the quality of governance enhancing development. Chalking out policies to incentivize the growth and expansion of employment in the formal sector of the economy is the chief policy prescription for the Governments of L.D.C.s for reducing the culture of rampant political violence, apart from other known benefits of formalization of the economy. To successfully achieve it will necessitate the Government to devise policies of arresting political clientelism in the unorganized sector, which is one of the main channels leading to violence.

Some reasonably possible consequences of such policy measures may lead to universal coverage of welfare schemes instead of targeted schemes, less State-dependence and more expansion of the market in service deliveries, etc. Over all, any policy change in this direction has the potential of radically changing the economy with far reaching implications for the polity. But these long term qualitative changes and consequences in policies depend on numerous other factors in reality, as well as on the de-jure executive's political will. To begin with, significant attention of policy makers on this measure of controlling political violence through clientelism is needed to be drawn, especially in the L.D.C.s, to move forward with any such policy in action.

A logical extension in theory will be to examine other dynamics and motives of violence, like deterring the opposition voters, 'targeted' and 'non-targeted' violence etc. A major necessity of this paper is to strengthen the results with further empirical evidence worldwide. Unavailability of such reliable data, especially from L.D.C.s has been an hindrance for the authors to proceed. Any survey based empirical checking is time taking and resource dependent, which itself calls for a separate work of its own. We intend to explore these in our future work.

Chapter 5

Investment and Democracy

[1]

5.1 Introduction

How does politics effect investments and economic development of poor countries? Why do large capital investments remain *historically* low in some regions? Why do some regions remain poor in industrialization? Does democracy help in development of less developed economies (L.D.C.s)? These questions continue to get substantial attention from scholars in the economic literature. But what and how the *political constraints* on the leader effect investment policies of a country has not been attempted so far in the formal literature of economic theory. We attempt to answer this question in this paper by offering a new framework of political economy.

It is widely accepted among scholars now to perceive investments as a coordination problem of selecting among multiple equilibria. In reality many business associations can be found to provide their members information and access to new opportunities for investments. They basically act like tools of coordination. Peng (2001) has argued that such coordination by business associations in a number of transition economies has made important contributions to wealth creation in poor countries. Efficient networks with non-market stakeholders help especially the foreign firms to obtain relevant

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information, accelerate investment decisions and reduce political risks (Peng 2001; Ho ltbruegge and Puck 2009, Batjargal 2007; Heikkila and Salmi 2015).

Conceptually, participation games with multiple equilibria are similar to economic models of decentralized production subject to economies of scale. At low levels of participation, agents face the equivalent to increasing returns of production. Whenever an agent participates in a group activity, she lowers the cost faced by others, thereby encouraging them to participate, as a result lowering the cost for others to join. Low levels of participation, including free riding, may be an equilibrium, but if the players find themselves in a situation with increasing returns, their decision to participate "crowd in" more participants until a new, higher level of participation arrives. This feature is the central theme of this paper.

Economists have long studied coordination failures and market failures that lead to situations of multiple equilibria characterized by both locally increasing returns that are conducive to capital accumulation and rapid income growth. Economists have widely accepted that coordination failures and market failures can each lead to situations of multiple equilibria characterized by both locally increasing returns that are conducive to capital accumulation and rapid income growth, as well as regions of rapidly diminishing returns where people face weak incentives to invest. A range of largely unintegrated theories exist to explain patterns of differential investment that lead to persistent poverty in equilibrium (Nelson 1956; Mazumdar 1959; Stiglitz 1976; Loury 1981; Dasgupta and Ray 1986, 1987; Banerjee and Newman 1993; Dasgupta 1993; Barham et al. 1995; Zimmerman and Carter 2003). For reasonably complete reviews of the poverty traps literature through early in the twenty- first century, see Azariadis and Stachurski (2005). Barrett, Garg, and McBride (2016) provide an updated summary of this literature.

Why some regions remain industrially backward while others remain rich has been a central question of economic development and industrialization. Rosenstein-Rodan (1943), Hirschman (1958) etc. have long interpreted economic development as a massive coordination failure, when investments do not occur because other complementary investments are depressed. This can only happen in the presence of complementarity, which is a particular form of externality where the action taken by an agent increases the marginal benefit to other agents from taking the same action. Zenghelis (2011) has discussed how due to ignorance towards positive externalities, private investors tend to underinvest in some technologies, and hence need to be incentivized. The model of this paper rests on such a mechanism.

In this paper we imagine coordination failure as a key determinant of investments for a poor economy, with complementarities and positive externalities as a benchmark feature. Our model deals with a backward economy where the Government tries to switch to a modern sector for economic growth and development through investments. We model the investment decisions as a coordination problem for the investors. The investors are classified as local and foreign investors by their location, behaviour and investment decisions. The coordination feature concerns the foreign investors, and their returns are dependent on other foreign as well as the local investors. This feature of externalities gives rise to the strategic complementarity in investment decisions resulting in the need for coordination. In this model we have conceptualised the investment phenomenon as a coordination problem among the investors. The need of coordination arises from strategic complementarity, which is a result of the externalities. Industries are characterized by scale economies, and externalities are an integral part of them. This is the main paradigm of our paper.

A growing literature looking at China identifies *collective action* by both state-owned and private businesses as playing an important role in enhancing the investment climate (Kennedy 2005; Zhang 2007; Deng and Kennedy 2010). In a similar spirit, we assume the role of both the state and private businesses in raising investments and development of a region.

In the extension of our baseline model, the Government faces an electoral constraint and we compare the results of the benchmark case to see how the political constraint affects investments.

We study situations with incomplete markets where investors must sink their investments before they can get to know how many others investors are investing, which all together generates the returns for each. Real life examples can be of any investments which only have value together. For this to happen, investors must have assurance of not having any widespread coordination failures, which is necessary for the value to be generated. This paper focuses on this concern of coordination failures within a political economic framework.

The possibility of undesirable under-investment equilibria arise when investment decisions are taken independently and are only individually profitable when enough other investors invest. Variations on this theme of strategic complementarity and market failure are Scitovsky (1954), Murphy Shleifer and Vishny (1989), Redding (1996), Acemoglu (1996), and Masters (1998) amongst others.

Inequalities persist across regions for *historic* reasons stemming from disbalances in income and capital accumulation. The relatively poor regions are limited in their capacities to invest productively. Hence deficits in necessary infrastructure and conducive climate for investments keep perpetuating over the time forming a loop. Examples of such hurdles can be lack of capital needed for a new business idea or the lack of innovative startup ideas itself, etc. Variations in initial beginnings of history or one time jolts may take countries to different paths of development altogether. This feature acts as the chief motivation of our study, and we look at the issue with an added new dimension, *democracy*.

What motivates the political-economic question is that, even though the return to foreign direct investment being potentially large in many developing countries (for example, the opening up of Eastern Europe provided advantages to multinational firms because of the low cost of labor, low levels of capital in place, and the proximity to major markets), the flow of direct investment is concentrated in just a few countries. Lucas (1990) attributes this lack of FDI in countries with potentially large marginal returns to capital to the fact that many developing countries face higher political risk than industrialized ones. The relationship between democracy and investments have attracted attention from economists, and the dominant claim is that for more democratic countries, domestic investment is a more important driver of growth (Ingham and Read, 2016). But since the quality of democracy is itself poor in the L.D.C.s, low investments and under development is often evident. This evidence is particularly compelling to take up the question of political economy in the context of L.D.C.s.

The primary finding of our paper is a substitutive role of local and foreign investors in poor countries. and how electoral political constraints change the government's effort and priorities in democracies. A possible consequence of the findings in this paper indicates perpetuation of "poverty trap," which is a helpless self-reinforcing mechanism (Azariadis and Stachurski 2005) which causes regional backwardness to persist.

Our formal treatment uses Global Games to model the coordination behaviour of investors. As coordination failures generate multiple equilibrium outcomes, the noisy economy helps us to overcome the problem of multiplicity of equilibria. Whether a coordinated equilibrium will arise depends on the expectation each investor holds about others' investments in that region. Formation of these expectations are primarily driven by the regional Government's expenditure on infrastructure for attracting investments, along with

other exogenous factors.

The investment dynamics in a democracy under a political constraint is the most novel contribution of this paper. We couldn't find, to the best of our knowledge, any notable micro-theoretic explanation of the political economy of a backward region from our approach in the current literature.

5.2 Related Literature

In economics, coordination failure has seen plenty of applications like in explaining economic recessions and poverty traps through the failure of firms to coordinate. In an economic system with multiple equilibria, coordination failure occurs when a group of investors could achieve a more preferable equilibrium but fail to because they do not coordinate their decision making.

To model the coordination behaviour among the investors we use the structure of global games (see Morris and Shin 2000 etc). Apart from other applications of Global games in political economy (like in models of revolution (see Mesquita, Edmond 2011 etc) and macroeconomic problems like currency attacks and related financial investment decisions (see Morris and Shin 2000, Morris 2001), it has also seen recent applications in strategic voting (Sarkar 2018).

The traditional literature of economic development has a limitation in studying regional backwardness and investment inequalities. The more recent literature on "geography and trade" in the "new trade theory" have enriched economists' understanding of regional inequality of development. Ray (2010) from the data on Income Mobility of Countries, 1980–2000 had illustrated how a history of underdevelopment or extreme poverty puts countries at a tremendous disadvantage by showing how not only the lowest-income countries but all countries in general might be caught in a difficult situation with downward direction of investments.

A range of largely unintegrated theories exist to explain patterns of differential investment that lead to persistent poverty in equilibrium (Nelson 1956; Mazumdar 1959; Stiglitz 1976; Loury 1981; Dasgupta and Ray 1986, 1987; Banerjee and Newman 1993; Dasgupta 1993; Barham et al. 1995; Zimmerman and Carter 2003).

The line of research in the literature of geography and trade is a natural consequence of focusing on how industry agglomeration and regional differentiation arise of any pattern of comparative advantage across regions.

When a region has been trapped in a low-level investment loop for a long time, nothing in the traditional theory of economic development prevents the possibility of that region from suddenly transiting into a high-level equilibrium. This is an important problem with theories of multiple equilibrium in traditional theory.

A small literature has studied how the past might weigh on the present when a multiple equilibrium model is embedded in real time (see, e.g., Adser'a and Ray (1998) and Frankel and Pauzner (2000)). Rosenstein-Rodan argued that a "big push" of large, balanced infusion of funds is ideal for bringing out an economy from a low-level equilibrium trap. Many studies took place on different steady states well driven by distant histories (see, e.g Dasgupta and Ray (1986), Banerjee and Newman (1993), Galor and Zeira (1993), Ljungqvist (1993), Ray and Streufert (1993), Piketty (1997) or Matsuyama (2000)).

Our approach is close to Hirschman, who has argued that certain "leading sectors" should be focused to spur private investments in complementary sectors. Complementarities have been extensively studied in the literature of economic development. They have been used to explain persistence of technological inefficiencies (David (1985), Arthur (1994)), lack of financial depth in developing countries (Acemoglu and Zilibotti (1997)), lack of investments in physical and human capital (Romer (1986), Lucas (1988)), self-sustenance of corruption (Kingston (2005), Emerson (2006)), growth of cities (Henderson (1988), Krugman (1991)), currency crises (Obstfeld (1994)), fertility transition (Munshi and Myaux (2006)) etc.

Makowski and Ostroy (1995) have shown that in presence of complementarities, coordination problems arise in competitive markets. Following up on Makowski and Ostroy (1995), three important papers Cole, Mailath, and Postlewaite (2001a, 2001b) and Felli and Roberts (2016) have shown how coordination failures can manifest themselves into under-investment equilibria, over-investment equilibria, and mismatch equilibria.

Economic theory offers a tradition of different models that can give rise to such traps at both the macro and micro levels. An early example is given by Nelson (1956). A related strand of literature considers political economy reasons for why poor countries remain poor, stressing the possibility of self-reinforcing low-quality institutions (for example, Acemoglu and Robinson 2012). Among many theories of poverty traps, one commonly invoked mechanism is that a country that is poor will remain poor because it will not be able to accumulate sufficient capital per capita for incomes to rise. Caucutt

and Kumar (2008) studied a "big push"–type model with a coordination failure arising from the fact that agents find it optimal to invest in labor-saving technologies only if other agents also do so. This coordination failure leads to a poverty trap when all agents fail to invest in the better technology.

A look at the literature of regional poverty gaps makes the scope and relevance of our study broader and wider. Notable studies on steady state traps with poverty breeding poverty are by Majumdar and Mitra (1982), Galor and Zeira (1993)), empirical surveys on economic conditions of the poor by Banerjee and Duflo (2007), Fields (1980) etc. One theory of mechanism is low levels of productivity born out of unfavourable natural environment and historical reasons such that in equilibrium most individuals or households of those regions continue to remain poor. This was labeled a single equilibrium poverty trap by Barrett and Carter (2013), and a geographic poverty trap by Kraay and McKenzie (2014).

The poverty traps are generated in a number of fashions, through institutions, and threshold effects in both physical and human capital. A seminal paper in this area is Azariadis and Drazen (1990) which considers poverty traps generated both by threshold effects in physical capital, There has been a relatively recent surge of activity in the literature on transitions. One strand of this literature is focused on the process of structural change, or a regime switch from an economy dominated by agricultural production, to one in which modern industrial production allows for sustained economic growth. Frequently, as in Hansen and Prescott (2002), and Galor and Weil (2000). Our model follows a similar threshold based framework, with the 'regime change' occurs when positive externalities generate competitive profits.

Foreign investors pay the key role of coordination in our model in spurring investments. Thus, a look at the literature of unequal distribution of F.D.I.s across countries is worth wile. Foreign direct investments have rapidly grown worldwide, peaking in the late 1980s. (See in particular articles by Krugman and Graham, and by Lipsey in that volume. See also Hummels and Stern (1994), the UNCTAD World Development Report (1993), and Markusen and Venables (1995)). But asymmetry has remained among the developed and developing countries. The developed countries not only account for the overwhelming proportion of outward direct foreign investment, but they are also the major recipients of direct foreign investment. Hummels and Stern (1994) report that in 1985 the developed countries were the source of 97 percent of direct investment flows and the recipient of 75 percent. Earlier, most empirical work on F.D.I. investments used to focus on US firms (Bloningen,

Davies, and Head, 2003; Braconier, Norback, and Urban, 2005; Davies, 2008; Bergstrand and Egger, 2013). Later, studies on the determinants of foreign investments took up for the emerging economies. There are large differences across industries in the degree to which production and sales are accounted for by multinational firms (Brainard, 1993b). This asymmetry in investments and resulting inequalities in economic development has been the chief motivation for our study.

The relationship between democracy and economic growth has drawn wide attention. In "Democracy Does Cause Growth", Acemoglu et al. present evidence from a panel of countries between 1960 and 2010 challenging this view. Their central estimates suggest that a country that switches from non-democracy to democracy achieves about 20 percent higher GDP per capita in the long run, i.e. over the next 30 years. The role of FDI in poverty reduction is also undisputed. One may refer to Uttama N.P. (2015) studying data at the country level for ASEAN-6 during the period 1995–2011. Their study concludes that FDI is conducive to poverty reduction. It supports the notion that regional value chain enhancement on FDI flows is beneficial for this region. For our context, we focus on the role of investments in a democracy.

The literature on political constraints for investments is relatively scarce, especially for the poor economies. Few very recent attempts are worth mentioning which validate our approach. Arslan, Ünal and Ökten, Zeynep. (2010) studied the relation between FDI and democracy in Turkey, covering the period 1970-2010 using Johansen (1988) cointegration and Error Correction Model (ECM) tests. The result of the cointegration analysis indicates that there is a long-run relationship between foreign direct investment (FDI) and democracy. Additionally, the Error Correction Model suggests an unidirectional causal relationship from democracy to foreign direct investment.

Li, Quan and Resnick, Adam, 2003 explored whether increased democracy promotes or jeopardizes foreign direct investment (FDI) inflows to less-developed countries. They found that democratic institutions have conflicting effects on FDI inflows. On one hand, democratic institutions hinder FDI inflows by constraining host governments' ability to offer generous financial and fiscal incentives to foreign investors. On the other hand, democratic institutions promote FDI inflows because they tend to ensure more credible property rights protection, reducing risks and transaction costs for foreign investors. Hence, the net effect of democracy on FDI inflows is contingent on the relative strength of these two competing forces. Empirical analyses of

fifty-three developing countries from 1982 to 1995 substantiate their claims. They found that democracy in general encourages FDI inflows.

Some scholars have argued that democracy attracts FDI through the mechanism of political constraints, which reduce the risk of negative policy changes. For example, Tyson Roberts (2018) has proposed a theoretically more comprehensive argument claiming that political constraints are attractive to investors when the host country policy environment is FDI-friendly, because these political constraints reduce the probability of negative policy changes in the future. Our argument is close to this of approach with using political constraints, with a different objective of the political agent.

Quan and Resnick 2003 explored the under-researched dimension of political risk: electoral uncertainty, which is close to our approach. Using 56,996 MandA and greenfield investments into 55 countries, they showed that close upcoming elections reduce the likelihood of foreign investments. Based on political cycle theory, they hypothesized and empirically showed that countries with lower political constraints allow incumbent governments to offer cheaper and more profitable deals to foreign investors for their own political benefits, thus moderating the negative effect of close upcoming elections. Finally, they showed that firms with previous experience in pre-election bargaining are more likely to invest under electoral uncertainty. We don't go into that much detail here and model our political constraint as a re-election only.

To the best of our knowledge, our attempt of modelling the *perception dynamics* of investment phenomenon using Global Games and studying the political constraints for the democratically elected Government in a poor country is a novel attempt in the economic literature. We present our formal model in the next section.

5.3 Theoretical Framework

Consider a one period model with an open economy, with the production of a single industrial commodity. The economy consists of a country A and and an outside option called country B. The Government of country A is trying to attract investment for industrialization. Investing in B is the outside option of these investors. We assume each unit of invested capital generates a unit employment in A and labor in each region is immobile.

The Investors

Total investors in the economy are n, each having a unit capital to invest. There are two types of capital investors, *foreign* n_F and *local* n_L, such that $n_F + n_L = n$. Local investors are domestic firms who can invest only in A, where as foreign investors are multinational firms who can invest either in A or B. We differentiate between the foreign and local investors by their available options of investment destinations. Foreign investors have the option of investing in another region, viz. region B, whereas domestic firms do not have any such option. We assume from the beginning that foreign investors will invest in A only when total expected investment in A is sufficiently high; otherwise they invest in B *by default*. The local investors have only two choices; either to invest in A or not invest *at all*. All the investors are taking their investment decisions *simultaneously* in our single period model. For the rest of this paper, we carry our analysis with respect to the region A.

Business Climate

Let λ be the investment climate in region A, which can take any real value. A high value of λ indicates over all conducive and favorable climate of investment, where as a lower λ indicates difficulty in generating favorable returns.[2] It depends on the Government of region A's effort e to attract investment, $e \in [0, \infty)$. This effort can be comprised of infrastructural spending, different kinds of subsidies, administrative reforms, business-friendly rules and regulations, etc. But the Government's effort is not the sole determinant of investment environment, as many additional factors may come into play. We model them all together as a random exogenous shock ξ.

Thus we define

$$\lambda = e + \xi \tag{5.1}$$

where the random shock ξ is defined over the support of real axis $(-\infty, +\infty)$ and follows a bell shaped distribution $F(\xi)$ with mean normalised at 0 and variance σ^2. The Government's problem is to choose an e such as to maximize the probability of investment in A. It's benefit from investments in normalized to unity. The Government's motivation for putting up this effort may come from different aspects like attempts for development, re-election prospects,

[2]Note that λ can be negative, indicating unstable and risky climate of investment in A

liberal economic ideology, etc.[3]

Each investor observes the investment climate λ in region A with a noise ϵ. This noise is generated from the imperfect information about A's investment climate.[4] In particular, if λ is the actual state of investment in A, an investor observes a signal $s \in [\lambda - \epsilon, \lambda + \epsilon]$ where $\epsilon > 0$.

We assume that s is uniformly distributed over its support. After observing the signal, each investor tries to infer the true state of λ by arriving at the conditional expectation $E(\lambda|s)$. Local investors in A get a positive return from investment only if there is sufficient total investment in A, which will be possible only in a conducive environment for investment. Specifically, they believe they will get a positive return from their investment only when λ is high enough, or better than say $\underline{\lambda}$. It's an exogenous threshold value of λ for the local investors, above which they will be willing to invest. Hence, based on their signal, each local investor decides to invest in A *iff* $E(\lambda|s) \geq \underline{\lambda}$. Otherwise, they do not invest. We assume that the local investors get a fixed positive profit each, when $\lambda \geq \underline{\lambda}$.[5]

Herd Behaviour

Each local investor's decision is based directly on her inference about λ. But unlike them, the decision of an individual foreign investor to invest in A depends on how many other investors are investing in A. Her decision is based on comparing the expected benefit from investing in A with that of B. The return from investing in B is equivalent to the opportunity cost of investing in A. Her expected benefit from investing in A is based on how many other investors, *both* foreign and local, are investing in A. If she expects total investment there is to be large enough, she may expect her benefit there may surpass that of B and hence can invest in A. So this investment decision becomes *strategic*. This expectation about total investment is formed from her perception about the state of investment λ prevailing in A. Based on her signal s about λ, she first infers the true state of λ there, and then tries to perceive how many others may invest in A.

[3]The Government's benefit is assumed to capture the gain from any such possible source.

[4]In reality, an investor's assessment about a region's investment opportunity depends much on collective perception stemmed from allied factors. This also gets captured by ϵ

[5]We do not need to model their profit function explicitly to reach our results.

Profit Externalities

To formalize our story, we assume $\underline{I}$ as that exogenous size of investment in A, which is just sufficient to generate a non-zero profit from investing a unit capital in A. This pre-specified investment threshold $\underline{I}$ is exogenously given and perfectly known by all the investors. Thus, the per unit profit for a foreign investor in region A is derived from a non-convex profit function

$$\begin{aligned} \pi &= \pi_A \text{ for } I \geq \underline{I} \\ &= 0 \quad \text{otherwise} \end{aligned}$$

where I is the total investment in A and $\underline{I}$ is the minimum investment required in A to earn a competitive profit from A. Otherwise, they will invest in B where the return is π_B.[6]Such formulation of production function captures our idea of *profit externality*. Note that $\pi_A > \pi_B$, which ensures the possibility of foreign investors investing in A. All non competitive profits are normalised to 0.

We summarize the sequence of events below:

1. In the beginning, the Government of region A chooses an effort level e to attract investment in A from its local investors n_L and the global investors n_F from region B.

2. Their effort e is chosen so as to maximize the probability of industrialization investment in A less the cost of its effort. The choice of e depends on parameters like the distribution function of ξ, the marginal cost of effort e.

3. The random shock ξ is realized.

4. Given ξ, the actual investment climate in A, i.e. λ is realized.

5. Consequently, all the investors observe the signal s for λ, with some noise ϵ.

We next turn to compute the equilibrium outcome of this co-ordination game.

[6]This profit may be expected or deterministic. We do not need to specify the profit function in region B explicitly and take it as exogenous.

5.3.1 Equilibrium

We start with computing the size of investment in A from the local investors first. As each local investor receives a signal s about λ, she first tries to infer the true λ by arriving at the conditional expectation $E(\lambda|s)$. We can calculate it as

$$E(\lambda|s) = \int_{s-\epsilon}^{s+\epsilon} \frac{1}{2\epsilon} d\lambda = s \tag{5.2}$$

Then she decides to invest *if and only if* $E(\lambda|s) \geq \underline{\lambda}$, which in turn implies $s \geq \underline{\lambda}$. As we are considering a representative investor, every local investor thinks in this manner.

From here, using 5.2, we can calculate the total proportion of local investors who will invest in A. We define the total investment size from local investors in A as $a(n_L, \lambda)$ and calculate to find it as

$$a(n_L, \lambda) = n_L P(s \geq \underline{\lambda}) = \frac{n_L}{2\epsilon} \int_{\underline{\lambda}}^{\lambda+\epsilon} ds = \frac{n_L}{2\epsilon}[\lambda + \epsilon - \underline{\lambda}] \tag{5.3}$$

Next we compute the equilibrium behaviour of the strategic investors, which is somewhat more complicated.

We arrive at the equilibrium behaviour of the foreign investors in three distinct steps. First, we start with an arbitrary belief $\tilde{s}$ of a strategic investor which takes the following form: a strategic investor believes that all other a strategic investors will invest in A if and only if they observe a signal $s \geq \tilde{s}$.

Secondly, given this belief, a foreign investor calculates her best response $\hat{s}(\tilde{s})$. The best response involves the following: given that local investors of A are investing if and only if they get a signal $s \geq \underline{\lambda}$, and other foreign investors are investing if and only if they receive a signal $s \geq \tilde{s}$, it is optimal for the representative foreign investor to invest in A if and only if she receives a signal $s \geq \hat{s}$.

Thirdly, the symmetric Nash equilibrium signal for all foreign investors is one where $\hat{s} = \tilde{s}$, which we denote by s^*.

Our representative investor calculates that when the actual state of investment in A is λ, the proportion of them receiving signal at least as large as $\tilde{s}$ and hence investing in A is

$$n_F P(s \geq \tilde{s}) = n_F \int_{\tilde{s}}^{\lambda+\epsilon} \frac{1}{2\epsilon} ds = \frac{n_F(\lambda + \epsilon - \tilde{s})}{2\epsilon}$$

.

Hence she perceives that total size of global investors investing in A is

$$b(\lambda) = n_F P(s \geq \tilde{s}) = \frac{n_F(\lambda + \epsilon - \tilde{s})}{2\epsilon} \tag{5.4}$$

She knows that the return in A will get generated only if the total size of investment crosses the pre-fixed limit $\underline{I}$. This requirement boils down to

$$a(n_L, \lambda) + b(\lambda) \geq \underline{I}$$

which, using 5.3 and 5.4, reduces to

$$\frac{n_L}{2\epsilon}[\lambda + \epsilon - \underline{\lambda}] + \frac{n_F}{2\epsilon}[\lambda + \epsilon - \tilde{s}] \geq \underline{I} \tag{5.5}$$

It should be clear to the reader that the decision making of the foreign investors are taken simultaneously along with the local investors, with the foreign investors having full knowledge about the behaviour and threshold signal of the local investors. Unlike the local investors, the foreign investors do not have any pre-set threshold signal, and they solve their best response signal by taking into account all other investors' expected behaviour.

Let $\hat{\lambda}$ be that value of λ for which this condition 5.5 is satisfied with equality. Clearly for $\lambda > \hat{\lambda}$, investment in A gets profitable. Given $\hat{\lambda}$, her next job is to compare the expected benefit from investing in A with the opportunity cost, i.e. with the return from B. Hence for any signal s investing in A will be profitable with probability

$$P(\lambda \geq \hat{\lambda}) = \frac{1}{2\epsilon}\int_{\hat{\lambda}}^{s+\epsilon} d\lambda = \frac{s + \epsilon - \hat{\lambda}}{2\epsilon} \tag{5.6}$$

Consequently, using 5.6, the net benefit from investing in A is greater than the return from B if the following inequality holds:

$$\frac{\pi_A(s + \epsilon - \hat{\lambda})}{2\epsilon} > \pi_B \tag{5.7}$$

Let $\hat{s}$ be the signal for which the inequality 5.7 is satisfied with equality. So, when the foreign investor gets the signal $\hat{s}$, she gets indifferent between investing in A and B. But she invests in A for all signal $s \geq \hat{s}$. In other words, given the belief $\tilde{s}$, the best response of the foreign investor is $\hat{s}$. Substituting $\hat{\lambda}$ for the value of λ and solving for the best-response $\hat{s}$ to $\tilde{s}$, we get

$$\hat{s} = \hat{\lambda} + (\frac{2\pi_B}{\pi_A} - 1)\epsilon \tag{5.8}$$

It is important to understand that the best-response $\hat{s}$ is implicitly a function of $\tilde{s}$.

The third step in arriving at the equilibrium is to put $\hat{s} = \tilde{s} = s^*$, which gives us a symmetric Nash Equilibrium.

Let us define the equilibrium value of $\hat{\lambda}$ corresponding to s^* by λ^*. Substituting $\hat{\lambda}$ in 5.8 we solve

$$s^* = \underline{\lambda} + 2\epsilon[\frac{1}{n_L}(\underline{I} - \frac{n_L}{2}) - n_F(1 - \frac{\pi_B}{\pi_A}) - \frac{1}{2} + \frac{\pi_B}{\pi_A}] \tag{5.9}$$

Substituting the value of s^* in the above condition, we can solve for final expression of λ^* as

$$\lambda^* = \underline{\lambda} + \frac{2\epsilon}{n_L}[(\underline{I} - \frac{n_L}{2}) - n_F(1 - \frac{\pi_B}{\pi_A})] \tag{5.10}$$

Here, λ^* is the crucial variable which determines chances of investment in A, both from the local and global investors. Note that $\lambda^* < \underline{\lambda}$ makes the case uninteresting when only global investors and none of the local investors will invest. Hence, we assume $\lambda^* > \underline{\lambda}$, for which it's sufficient to assume

$$\underline{I} \geq \frac{n_L}{2} + n_F(1 - \frac{\pi_B}{\pi_A}) \tag{5.11}$$

Let's denote the R.H.S. of A.6 by I'.

This assumption simultaneously ensures s^*, the best response threshold signal of foreign investors to be higher than that of the local investors, i.e. $s^* > underline\lambda$. The implication of this assumption is that generating a higher profit from investing in A than B requires sufficiently high total investment in A. A higher the R.H.S. of A.6 means more difficult it is for the foreign investor to get the benefits of profit externalities due to increasing return from investments in A. A higher $\underline{I}$ may be interpreted as *higher investment un-competitiveness* of A for the global investors, compatible with its economic backwardness. Therefore, poorer the region A is, more difficult it is for A to attract foreign investments.

Observe that a violation of A.6 implies $\lambda^* < \underline{\lambda}$, which in turn implies that it is *sufficient* for the Government to attract *only* foreign investors in

the equilibrium to spree investments, without needing local investors. On the other hand, $\lambda^* > \underline{\lambda}$ implies local investments are *necessary* for global investments, and the Govt has to try for attracting both. As our argument from the beginning is centred around complementarity and positive externality, for which to generate, investments from both local and foreign investors are needed, we assume A.6 to hold true through out our analysis.

The critical variable for attracting investments is λ^*. The chances of investment now reduces to $P(\lambda \geq \lambda^*)$ using 5.10. We denote this investment chances by $\pi(e, \lambda^*)$ as a function of the choice variable e and parameter λ^*. From the assumption A.6, targeting λ^* ensures inviting both local and foreign investors, which makes the case meaningful and interesting. The Government of region A's problem is to choose an e so as to maximize this probability. It's *objective function* is given by

$$P(\lambda \geq \lambda^*) - c(e) \tag{5.12}$$

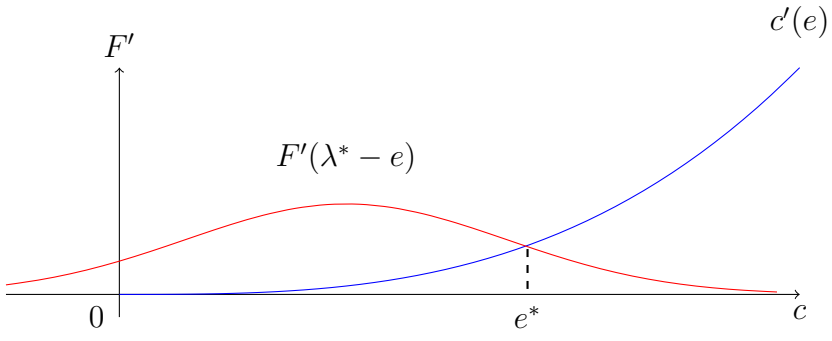
where $c(e)$ is assumed to be convex, i.e. $c'(e) > 0$ and $c''(e) > 0$. Using 5.1 we derive

$$P(\lambda \geq \lambda^*) = 1 - F(\lambda^* - e)$$

which gives the first order condition as the following:

$$f(\lambda^* - e) = c'(e) \tag{5.13}$$

where $f = F'$. Note that the S.O.C. is satisfied for $-f' - c'' < 0$ and for the uniqueness of equilibrium, we assume $f' > 0$. From here we can solve for the Government's equilibrium choice of effort e^* implicitly.



Optimal Choice of Effort e^*

5.3.2 Results

Studying the investment dynamics is the focus of this paper. First, we look at the Government's effort for investment with respect to the investors. From our above calculations, it follows that $\frac{de^*}{dn_F} = \frac{f'}{f'+c"} \frac{d\lambda^*}{dn_F}$ and $\frac{de^*}{dn_L} = \frac{f'}{f'+c"} \frac{d\lambda^*}{dn_L}$. Hence, under our assumptions of $f' < 0$ and $\mid c" \mid > \mid f' \mid$, we get $\frac{de^*}{dn_F} > 0$ and $\frac{de^*}{dn_L} > 0$, where $\frac{d\lambda^*}{dn_F} < 0$ and $\frac{d\lambda^*}{dn_L} < 0$ are easily verifiable. We formalize this finding as our first result in the following.

Proposition 5.3.1 *An increase in the size of local (n_L) and foreign (n_F) investors increase the threshold business climate (θ^*) required to spur investments in the backward region.*
Hence an increase in the size of local (n_L) and foreign (n_F) investors increase the effort for investments (e^*) chosen by the Government in equilibrium.

Now we try to look at the relationship between the Government's effort for investment and the roles played by the local and foreign investors in equilibrium. Total local investment in equilibrium can be obtained from $n_L P(\lambda \geq \underline{\lambda})$, where as total foreign investment in equilibrium can be obtained from $n_F P(\lambda \geq \lambda^*)$. We find the signs of both $\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda})$ and $\frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*)$ to be positive under our assumptions of $f' < 0$ and $\mid c" \mid > \mid f' \mid$, which brings us to the following result.

Proposition 5.3.2 *An increase in the size of local (foreign) investors increases foreign (local) investments and vice versa. Thus, local and foreign investors act as complements in attracting investments to a backward region.*

This is the main and most interesting result from our benchmark model.

Now we look at the change in composition of the investors, keeping their total size n unchanged. This means that now an increase in n_L (n_F) will result in a decrease in n_F (n_L) and vice versa, which wasn't the case until before. Proceeding with the total local investment in equilibrium $n_L P(\lambda \geq \underline{\lambda})$ and total foreign investment in equilibrium $n_F P(\lambda \geq \lambda^*)$, its easy to check that

$$\frac{\partial \lambda^*}{\partial n_L} \geq 0 \text{ and } \frac{\partial \lambda^*}{\partial n_F} \leq 0 \text{ for } n(1 - \frac{\pi_B}{\pi_A}) \geq \underline{I} \tag{5.14}$$

and

$$\frac{\partial \lambda^*}{\partial n_L} \leq 0 \text{ and } \frac{\partial \lambda^*}{\partial n_F} \geq 0 \text{ for } n(1 - \frac{\pi_B}{\pi_A}) < \underline{I} \tag{5.15}$$

Let's rename

$$n(1 - \frac{\pi_B}{\pi_A}) = I_0 \tag{5.16}$$

From the above, it follows that

$$\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda}) < 0 \text{ and } \frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*) < 0 \text{ for } \underline{I} \leq I_0 \tag{5.17}$$

For $\underline{I} \geq I_0$, the signs of $\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda})$ and $\frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*)$ are ambiguous.

This clearly shows the role of local and foreign investors to be substitutes for $\underline{I} \geq I_0$. Note that this condition doesn't contradict with our earlier assumption of $\underline{I} \geq I'$.

The condition $\underline{I} \geq I_0$ can be interpreted as the situation when the minimum investments required for foreign investments to be competitive is sufficiently high, at least above I_0. This requirement for the threshold level to be sufficiently high indicates more backwardness of region A for which generating positive externalities get more difficult. For a lesser backward region, i.e. when externalities can be generated for a not so high threshold $\underline{I} \geq I_0$, this substitutive role among the local and foreign investors cannot be ensured. We formalise these findings below.

Proposition 5.3.3 *For an extreme backward region where generating positive externalities from investments is more difficult ($\underline{I} \geq I_0$) for a foreign firm, an increase in the size of local (foreign) investors, keeping the total size of investors fixed, decreases foreign (local) investments and vice versa. Thus, local and foreign investors act as substitutes for developing investments in a very poor region, when their relative composition changes without any change in the total size of investors.*

Recall that the investment decision of the foreign investors is dependent on that of the local investors in terms of generating the positive externalities. But this dependence is not biting for a high threshold, i.e. for ($\underline{I} < I_0$), which can only occur for an industrially backward region.

This finding has important implications for the development of a poor region. A region that is historically backward may only have to depend on say local investments, as this dependence itself may hinder foreign investments.

The reverse is also true for foreign investments. Thus for its economic development, a very poor region may have to depend only on either of the two for investments, which may make its transition process restrictive and slower. Thus poorer regions may see a differential pattern of investments in terms of local and foreign investments.

The implication of the earlier result is interesting because it shows that for those regions which see high local investments will not get high foreign investments and vice versa. Hence some regions may have to perpetually depend on local business while some regions may predominant;y have to depend on foreign investments, with an asymmetry in investments existing in each. This may have far reaching effects and may impose various kinds of challenges for the economic development of those regions.

We present other relevant comparative statics below.

Proposition 5.3.4 *An increase in the profit from increasing returns (π_A) increases the chances of investments in a poor region A where as an increase in the profit (π_B) in the foreign land (B) decreases the chances of investment in A.*

Its straightforward to check that $\frac{\partial \lambda^*}{\partial \pi_A} < 0$ and $\frac{\partial \lambda^*}{\partial \pi_B} > 0$. From here, it follows $\frac{\partial P(\lambda \geq \lambda^*)}{\partial \pi_A} = -f(\lambda^* - e)\frac{\partial \lambda^*}{\partial \pi_A}\frac{c"}{f'+c"} > 0$ and $\frac{\partial P(\lambda \geq \lambda^*)}{\partial \pi_B} = -f(\lambda^* - e)\frac{\partial \lambda^*}{\partial \pi_B}\frac{c"}{f'+c"} < 0$ directly. This finding is reasonable and intuitive.

Now we move on to see in the following section how these results change under electoral constraints, i.e how does political constraints in a democracy affect the Government's choices and development of a backward region.

5.3.3 Discussion of Baseline Model

The assumption of a one shot interaction in an investment setting with informational differences provide the basic character of the investment phenomenon in our baseline framework.

We argue that investment itself is a one shot action that cannot be reversed easily once the investment has been done. This feature builds the basic characteristics of the investors's behaviour in our framework. We focus on the feature that investors wait and watch other investors' decisions to decide their own investment decisions. Our argument can be better understood with an analogy to the feature of hold-out. Investors wait for others to invest in a similar manner analogous to the hold out. This feature generally

remains unchanged at any and every period, irrespective of usual fluctuations in a typical scenario. This investment behaviour is the sole source of the investment externality feature, which is the crux of our model.

Moreover, in a multi-period framework, it is realistic to assume that investment value depreciates over each period. In that case, the rational decision making considerations boil down to the same mechanism like our present single period model. Each period will see a repetition of the same cost benefit exercise like we have computed. Thus it takes us to the same problem of a fresh investment decision at each period that we have considered in our present framework.

One shot interaction gives rise to more scope of informational asymmetry than a multi-period model as in the latter the investors get the scope to learn from the past history at earlier periods unlike a single period model. In our model, the investment decisions of foreign investors are dependent on the decision of all other investors' decisions, which is a typical benchmark case commonly assumed as a standard in the economic literature. Moreover, as far as the herd behaviour of foreign investors in our model is concerned, our result arrives at the same direction of conclusions with those of the seminal papers of herd behaviour of investments like Banerjee (1992), Bikhachandani (1992) etc. Hence a multi-period model won't change the basic essence and character of our finding but may rather make the algebra a more tedious task without much value addition.

A dynamic extension only when the past and the present investments can be convincingly argued to be connected in a realistic manner. Our conjecture for that case is to possibly arrive at a finding which may tend towards an investment cascade. Two possible avenues of such an extension that may immediately come to the reader's mind are *one*, where the investors' behaviour mimic and give rise to the 'hold-out' problem as discussed above, and *second*, when the profit per unit of investment increases with the past investment, i.e. a *profit externality* arising from the past investment decisions. The authors will like to examine each of these extensions afresh as a separate exercise in some future work.

5.4 Extension: Democracy

Here we extend our baseline model to the main focus of this paper- investment dynamics under political constraints in a democracy. We model the

political constraint as an electoral constraint for the incumbent party currently holding office. The Government of region A now cares for office in addition to the investments. So far the office motive of the Government was dormant. We here assume the incumbent party in office will have to face an election at some later periodic time, as is regular in any political democracy. Now the Government of region A is constrained by its re-election probabilities for the task of industrialization. Hence the objective of the Govt becomes maximising a weighted average of the benefit from remaining in office and the gain from investments. The cost function of the Government considered in the earlier case now gets effectively replaced by the implied political cost of re-election.

Let us normalize the benefit from investments to unity like before, and define the relative benefit from office by γ. Let G be the total budget available to the Government which it can spend either on its effort e to attract investors or on various transfers to the voters. The effort e, like spending on infrastructure etc. are standardized into monetary terms here. The transfers can be collectively understood to be any kind of welfare measure which is private and exclusive, and can be targeted individually. Let t be the minimum transfer needed to ensure the vote of an individual, where N is the total size of the electorate in A. We assume each unit of investment employs one unit of labor and the labour wage to be high enough than t. Laborers and voters are assumed to be same agents in the economy. Therefore, each employment in the industrial sector ensures a vote for the incumbent in A in return of its effort for industrialization. All other features and sequence of events remain same like before, which we state below.

1. In the beginning, the Government of region A chooses an effort level e to attract investment in A from its own local investors and the global investors. Consequently, from the budget constraint G and vote buying cost t, the total size of transfer gets determined.

2. The e is now chosen such as to maximize the probability of industrialization in A as well as its re-election chances. The choice of e depends on parameters like the distribution function of ξ etc.

3. The random shock ξ is realized.

4. Given ξ, the actual investment climate in A, i.e. λ is realized.

5. Consequently, all the investors observe the signal s for λ, with some noise ϵ.

6. A local investor in A invests if $E(\lambda|s) \geq \underline{\lambda}$.

7. A global investor gets a return π_A from investing when at least $\underline{I}$ or more investors invest in A. She also has an opportunity cost of π_B if she invests in B. She invests in A if her expected gain from investing in A is at least equal to her opportunity cost of investing in B.

8. Finally, investments take place in A and B. Employments are generated.

9. Those who do not get employment in the industrial sector get the transfer from Govt.

10. In the end, elections take place. Pay-offs are realized. The game ends.

The computation of equilibrium is similar, but the Government's objective function has changed. We work this out in the next section.

5.4.1 The Government's Problem

We derive the objective function of the incumbent party in Government here, as per its motivation discussed above. There are two components in its objective function now: one, benefit from the office and the other from industrialization. Let's derive the political objective first. In deriving this, the ruling party will internalise its political constraint of re-election to the office. The incumbent party has two sources for political gains in the following election- one from industrialization and the other from transfers. In line with the assumptions stated earlier, the total vote the incumbent can expect in equilibrium is $I^* + \frac{G-e}{t}$ where $I^* = n_L P(s \geq \underline{\lambda}) + n_F P(s \geq s^*)$ is the total investment in equilibrium. In equilibrium, all foreign investors will decide according to their best response threshold signal s^* which was derived in the earlier section and remains unchanged here. The I^* is equivalent to the total number of jobs generated from the investments and there by total votes for the incumbent by the job gainers. The latter part $\frac{G-e}{t}$ follows from the budget constraint of the Government. For the total fund G available to the Government, after spending e for the investment drive, the Government can ensure $\frac{G-e}{t}$ votes for itself through the transfers. Hence, the political constraint under a system of majority rule reduces to

$$I^* + \frac{G-e}{t} \geq \frac{N}{2} \tag{5.18}$$

The objective function for industrialization remains same like earlier. Thus the new objective function of the Government here becomes

$$P(\lambda \geq \lambda^*) + \gamma P(I^* + \frac{G-e}{t} \geq \frac{N}{2}) \tag{5.19}$$

which it maximizes w.r.t. e to solve e^{**}.

Now using , the inequality $I^* + \frac{G-e}{t} \geq \frac{N}{2}$ reduces to $1 - F_\xi(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt}))$. Hence the objective function of the Government reduces to

$$1 - F_\xi(\lambda^* - e) + \gamma[1 - F_\xi(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt}))] \tag{5.20}$$

The F.O.C. of this maximization exercise becomes

$$f(\lambda^* - e) + \gamma f(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt})) = c'(e) \tag{5.21}$$

from where we can solve the e^{**}

The negativity of S.O.C. can be verified easily.

5.4.2 Results: Democracy

The main interest of this section lies in looking at how the effort of the Government for investments changes from the benchmark case under an electoral constraint.

Firstly note that a direct comparison of the e^{**} with e^* from the F.O.C.s reveal that $e^{**} > e^*$ for $t > \frac{2\epsilon}{n}$ and $e^{**} < e^*$ for $t < \frac{2\epsilon}{n}$ under all the earlier assumptions prevailing. Let's define $t_0 = \frac{2\epsilon}{n}$. Also, differentiating F.O.C. 5.21 w.r.t. t we can straight away find $\frac{de^{**}}{dt} > 0$ for $t > \frac{2\epsilon}{n}$ under all earlier assumptions from section 1. This finding means that in the presence of political constraint, the incumbent party's effort for industrialization will increase when ensuring votes from transfers is very costly, i.e. $t > t_0$, and vice versa.

This is an interesting finding which we formalize in the following result.

Proposition 5.4.1 *In a democracy, when ensuring each vote for re-election via welfare transfers is very costly ($t > t_0$), the ruling party in the Government's office will put more effort for investments in the equilibrium, than it would have done in the absence of any political constraint ($e^{**} > e^*$).*

When transfer gets cheaper ($t < t_0$), it's easier to ensure votes of more voters per unit of transfer and hence the party finds allocating transfers instead of investment efforts to be more beneficial ($e^{**} < e^*$).

The intuition behind this finding will be clear from looking at the re-election chances $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ which always decreases with t. But the re-election chance is affected both by e^{**} and t, and decreasing t increases the Government's effort for investments from the budget. Investments have two benefits for the party in office- firstly, the party is intrinsically and ideologically motivated for development via investments; additionally, it can also reap in political benefits from it as each unit of investment generates an unit employment which there by ensures the labourer's vote for the incumbent party. This latter effect dominates the former effect of increasing t on the re-election chances alone. So when it maximizes a weighted average of re-election probability and industrialization, and ensuring votes via transfers gets very costly, i.e. $t > t_0$ where $t_0 = \frac{2\epsilon}{n}$, the Government will find it more difficult to ensure its re-election by satisfying sufficient number of voters through welfare transfers alone and there by chooses the alternate path of development through capital investments.

A direct implication of this result can be thought for a poor region, which is a suitable scenario for this model. A high enough t ($t > t_0$) can be thought to be more suitable for a poor and economically under-developed region where the people are more dependent on the Government's welfare transfers. The benchmark example of our model has always been such an under developed region from the beginning. A high t can be interpreted as an indication of citizen's dependence on the Government's help, complementing with absence of alternate market opportunities and social infrastructure. The minimum level of sustenance for a decent livelihood has to be provided by the Government which makes the transfers costlier, and such scenarios are likely for a very economically backward region. For such extremely poor regions, this result predicts to witness higher investment initiatives by the elected Governments compared to the ones from less poor regions. This higher effort may

One can counter argue that a higher t may not necessarily always indi-

cate poverty. It is defined to be the minimum threshold transfer to ensure a vote for the ruling party, and this political support may not necessarily imply welfare necessity always. For example, a high political competition in presence of rival political parties may witness higher electoral promises of future transfers by the rivals. Assuming the promises to be credible, the incumbent facing competition will have to provide at least higher transfers to earn those voters. Such political competition may drive t up as well which may not necessarily be linked to poverty. But counter arguably, a competition of electoral promises over higher welfare transfers is itself indicative of an undeveloped economy. Preferences of economically well off voters change from government;s transfers to long term job prospects in the industrial sectors. But with a deeper look, here is an indirect structural mechanism at play also.

We have assumed the wage from the job generated by each unit of investment is higher than whatever the t be, so that beneficiaries from investment always support the incumbent. The voting decision is dependent on the two alternate choices of transfer and industrial wage only. Any voter who has to depend on t can be assumed to have not got or unskilled to secure a job in the industrial sector. It is more likely that the jobs from industrial sector will employ skilled labour and with higher investments, chances of absorption of the skilled population will increase. One possibility for higher dependence on transfers can be the presence of large unskilled population who may not avail the opportunities in the industrial sector and has to remain dependent on transfers, which is a characteristic feature of a backward economy. Even if a skilled labour does not secure a job in the modern sector, this itself indicates low investment and there by a backward state of the region's economy. Each of the possible cases arising from this condition can be directly or indirectly linked to under-development of the region to a higher or lower extent.

Therefore, from this result, we get that an extremely poor region may see greater push for investment from the elected Government of that region but a less or semi-poor region may not necessarily witness that. This has two very important qualitative consequences. Firstly, a mid level poor region may remain in a poverty trap for longer than an extremely poor region which will see greater effects for investments in presence of political constraints. Secondly, democracy works more efficiently for extremely under developed countries in terms of faster capitalist development. We present this in the following corollary.

Corollary 5.4.1 *Democracy is more efficient for capitalist development in an extremely poor region. Political compulsions of a democratically elected Government can pull out a high-poverty region out of economic backwardness faster than that of a medium or low poverty region.*

This is the primary and most important implication of the findings of this paper. This result agrees with the findings of Acemoglu et al. (2019) that democracy increases GDP by encouraging investments along with other factors, and find little support for the view that democracy is a constraint on economic growth for less developed economies.

We move on to present our next results in this section, summarizing from all the comparative statics' findings.

Proposition 5.4.2

1. When the relative benefits from holding the Government's office (γ) increases, the incumbent's effort for investment (e^{**}) increases in equilibrium when ensuring political support via transfers are costly ($t > t_0$). But when securing votes via welfare transfers are cheaper ($t < t_0$), it will find optimal to allocate more resources for transfers for an increasing γ resulting in an reduced effort for investment.

2. With an increasing size of the electorate (N), the Government will increase effort for investments (e^{**}) for costly transfers ($t > t_0$) but will decrease for cheaper transfers ($t < t_0$).

It's interesting to see how the ruling party's effort changes with a change in it's priorities, i.e. with a change in the composition of its' objective function γ. Like before, from the F.O.C. 5.21 we can derive $\frac{de^{**}}{d\gamma} > 0$ for $t > t_0$ and negative otherwise. Also, its easy to check that the re-election chances of the incumbent $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ always decreases with t. These two together clearly indicate that when the party in Government gives more weight to the gains from office, it will push for more investments when ensuring votes via transfers is costly but will allocate more resource for transfers when its cheaper to ensure support through them.

Large populations are characteristic features of poor countries. For $t > t_0$, $\frac{de^{**}}{dN} > 0$ and negative otherwise. Recall that $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ decreases with t, but this can be compensated by increasing e^{**} as it will increase I^*. Observing that the re-election chances $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ decreases with

rising N, the investment objective of the Government dominates here for the resulting choice of e^{**}. Thus for a large $t > t_0$, increasing N will push the Government's effort more towards investments away from providing more transfers when it will be less costlier to garner support via investments. For cheaper transfers $t < t_0$, increasing electoral size makes ensuring votes via transfers easier for the Government.

To relate our findings with the existing evidence in the literature, we see that Marin et. al. (2021) had found a positive effect of political competition on local investments including the larger fiscal policy. Chamon et. al. (2009) study Brazilian municipal elections to find that political competition increases investments and even larger when incumbents run for reelection. Based on F.D.I. level studies, Quan et al. (2018) find 'robust evidence' in favour of 'political constraints', and against 'domestic political risk' on studying the mechanism why democracies attract more or less FDI. But based on FDI share studies, they find 'relatively robust evidence' in favour of domestic political risk and little evidence for 'political constraints'. Misra (2021) finds that persistent re-election does not seem to lead to better development outcomes in fourteen states of India between 1952-2015, and that the historical institutions in the lagging states if India could be driving such result. These empirical findings in the literature support our findings and resonate with our model's mechanism, thereby strengthening our results. We have explicitly derived the theoretical conditions under which such evidences hold, rigorously analysing the mechanism leading to each of such conditions. the strength of our theoretical results lie in its generality of clearly showing the conditions when each of the possible outcomes can arise.

5.5 Aggregate and Local Signals

Our basic model suggests that local and foreign investors are strategic substitutes for the economic development of poor regions. These backward regions were identified as those where generation of positive externalities for new investors from the past investments are relatively more difficult. Of course, this happens in those regions for historical reasons.

So far we had assumed that investors of both types observe and care only about the overall state of investment as revealed by an economy wide aggregate signal. Now we relax this assumption.

We consider a country consisting of k regions. In each region there are

some local investors. In the i^{th} region, the proportion of local investors is n_L^i. Each local investor has a unit capital like before which she can either invest in the i^{th} region or not invest at all. The total share of foreign investors in the whole economy remain n_F like before, such that the total size of investors now has become $N = n_F + \sum_{i=1}^{k} n_L^i$. Each foreign investor has k units of capital and it can invest one unit of capital in each region. Her choice for each of the regions is either to invest an unit capital or not. At max she can invest her total k units of capital with each unit in each of the regions.

There is a single government ruling the entire country which decides how much effort to expend in each region. Let e_i be the effort put in the i^{th} region. The local state of investment of the i^{th} region is given by

$$\lambda_i = e_i + \xi_i \tag{5.22}$$

where the i.i.d. random variables ξ_i's are defined over the support of real axis $(-\infty, +\infty)$ and follows a bell shaped distribution $F(\xi)$ with mean normalised at 0 and variance σ^2. We further assume that the government can expend a maximum of e of effort, so that $\sum_{i=1}^{k} e_i = e$. Clearly, apart from effort, e_i can be interpreted as any resource which is scarce and which can be distributed between the regions for attracting investments. It essentially captures the Government's total budget constraint in spending resources for investments.

Let $\pi_i(e_i; \lambda_i^*)$ be the probability of investments in the i^{th} region. As above, this probability is a function of the effort e_i put in by the government in the i^{th}region and λ_i^*, the minimum realized value of the state in region i such that investments happen. Now the incumbent's problem is to choose e_i to

$$Max \sum_{i=1}^{k} \pi_i(e_i; \lambda_i^*) \; s.t. \sum_{i=1}^{k} e_i = e \tag{5.23}$$

The above problem can be solved provided we know λ_i^* which is to be determined, as before, from voters' behaviour. We presently devote our attention to that determination.

Consider any region i. We consider in this situation that foreign investors observe two types of signals, one *aggregate* and *local* where as the local investors observe only *local* signals. Both the local and foreign investors observe a local signal s_i about the local state λ_i. In addition, the foreign investors observe an aggregate signal s about the overall state of the economy of the

country denoted by λ like before. While λ depends on broad investment policies like tax incentives, profit and cost subsidies, monetary incentives etc., λ_i refers to the local investment climate of the i^{th} region and reflects local investment infrastructures helpful for investments like roads, electricity, local markets of any good to be produced etc. This λ_i depends upon the effort put in by the incumbent for developing such local resources to facilitate investments in region i. Local investors, in contrast to the foreign investors, observe only local signals s_i about the local resources suitable for new investments. We further assume that the signals are observed with error and are uniformly distributed along the true values of the respective states of investments. More specifically we assume that s_i is uniformly distributed over $[\lambda_i - \epsilon, \lambda_i + \epsilon]$ and s is uniformly distributed over $[\lambda - \eta, \lambda + \eta]$.

We start with the behaviour of local investors. We assume that a local investor has a minimum standard for the local state of investment. More specifically, a local investor of i^{th} region invests in region i if the following condition is satisfied:

$$s_i \geq \lambda_i \tag{5.24}$$

Thus in any region i, number of local investors deciding to invest in region i based on their local signal is given by

$$n_L^i P(s_i \geq \lambda_i) = n_L^i (\frac{\lambda_i + \epsilon - \lambda_i}{2\epsilon}) \tag{5.25}$$

Let us now consider the foreign investors. We now start with two beliefs of the representative foreign investor, viz. $\tilde{s_i}$ and $\tilde{s}$ about the local and overall investment climate above which other foreign investors will invest in the i^{th} region. The formulation implies that when each foreign investor receives a satisfactorily high signal about *both* the local and overall state *each*, *then only* she will invest in the i^{th} region. Thus the size of foreign investors investing in region i will be given by

$$n_F P(s_i \geq \tilde{s_i}) P(s \geq \tilde{s}) = n_F (\frac{\lambda_i + \epsilon - \tilde{s_i}}{2\epsilon})(\frac{\lambda + \eta - \tilde{s}}{2\eta}) \tag{5.26}$$

Proceeding like before, defining $\hat{\lambda_i}$ and $\hat{\lambda}$ as that local state and overall states λ_i and λ respectively above which foreign investors invest in region i, we can solve them from the equation

$$n_L^i (\frac{\hat{\lambda_i} + \epsilon - \lambda_i}{2\epsilon}) + n_F (\frac{\hat{\lambda_i} + \epsilon - \tilde{s_i}}{2\epsilon})(\frac{\hat{\lambda} + \eta - \tilde{s}}{2\eta}) = \underline{I} \tag{5.27}$$

In what follows, we shall keep the aggregate state of the economy in the background to the extent possible and focus on the regional allocation of efforts. We assume that the true overall state of investment in the country is

$$\lambda = \tilde{\lambda} \tag{5.28}$$

and the representative foreign investor's belief $\tilde{s}$ about other foreign investors investing in country A above this signal coincides with the true state $\tilde{\lambda}$. This means that for any given overall state of investment in the country $\tilde{\lambda}$, if local investment climate in region i seems sufficiently favorable to the foreign investor, she will invest in region i irrespective of the overall climate prevailing in other parts of the country. However, in spite of this assumption, we will eventually show that the mere existence of the overall signal will have interesting implications for regional effort choices of the Government.

This assumption readjusts the size of foreign investments in region i, which is obtained by replacing $\tilde{s}$ by $\tilde{\lambda}$ in 5.5, to arrive at the reduced form of 5.5 as

$$n_L^i(\frac{\hat{\lambda_i} + \epsilon - \lambda_i}{2\epsilon}) + n_F(\frac{\hat{\lambda_i} + \epsilon - \tilde{s_i}}{4\epsilon}) = \underline{I} \tag{5.29}$$

Each foreign investor will solve her *best-response* signal $\hat{s_i}$ for region i from

$$\frac{\pi_A(\hat{s_i} + \epsilon - \hat{\lambda_i})}{2\epsilon} = \pi_B \tag{5.30}$$

where $P(\lambda_i \geq \hat{\lambda_i}) = \frac{(s_i + \epsilon - \hat{\lambda_i})}{2\epsilon}$ gives the chances of investments' success in region i.

Denoting the foreign investor's best-response cut-off signal for region i by ${s_i}^*$ in equilibrium, which is obtained by ${s_i}^* = \hat{s_i} = \tilde{s_i}$, we solve it to get

$${s_i}^* = \lambda_i - 2\epsilon[1 - \{\frac{1}{{n_L}^i}\left(\underline{I} - \frac{n_F}{2}(1 - \frac{\pi_B}{\pi_A})\right) + \frac{\pi_B}{\pi_A}\}] \tag{5.31}$$

and the corresponding critical state of region i for investments to happen as

$${\lambda_i}^* = \lambda_i - [1 - \frac{2}{{n_L}^i}\{I - \frac{n_F}{2}(1 - \frac{\pi_B}{\pi_A})\}]\epsilon \tag{5.32}$$

It is easy to check that

$$\frac{\partial {\lambda_i}^*}{\partial {n_L}^i} < 0 \Leftrightarrow \underline{I} \geq \frac{n_F}{2}(1 - \frac{\pi_B}{\pi_A}) \tag{5.33}$$

.

Recall that our earlier assumption in A.6 ensures this condition in R.H.S. too. Hence, under prevailing assumption of A.6,

$$\frac{\partial {\lambda_i}^*}{\partial {n_L}^i} < 0 \Leftrightarrow \underline{I} \geq I' \tag{5.34}$$

.

Now coming to the Government's problem, it allocates its' regionwise optimal effort ${e_i}^*$ as per 5.23, where we have $\pi_i(e_i; \lambda_i^*) = P(e_i + \xi_i \geq {\lambda_i}^*) = 1 - F({\lambda_i}^* - e_i)$. From where we get its F.O.C. $\forall i, j$ as

$$\frac{\partial \pi_i(e_i; \lambda_i^*)}{\partial e_i} = \frac{\partial \pi_j(e_j; \lambda_j^*)}{\partial e_j} \tag{5.35}$$

This, in turn, implies that e_i and e_j are chosen in such a way that $F'({\lambda_i}^* - e_i) = F'({\lambda_j}^* - e_j)\ \forall i, j$. As from the beginning we have restricted ourselves to that part of F where $F'({\lambda_i}^* - e)$ is strictly increasing in e, so in equilibrium we get ${\lambda_i}^* - e_i = {\lambda_j}^* - e_j$. What readily follows from here is that if ${\lambda_i}^* < {\lambda_j}^*$, then $e_i < e_j$ and vice versa.

This also concludes that $\pi_i(e_i; \lambda_i^*) = \pi_j(e_j; \lambda_j^*)\ \forall i, j$ in equilibrium.

Also, from 5.34 we already have seen that for a very backward region, i.e. $\underline{I} \geq I'$, if ${n_L}^i > {n_L}^j$, then $\lambda_i^* < \lambda_j^*$, there by implying $e_i < e_j$. The implication of this finding is summarized in the following proposition:

Proposition 5.5.1 *Among extremely backward regions ($\underline{I} \geq I'$) where generating profit externalities is relatively difficult for a foreign firm, the Government prioritizes its effort on those regions where presence of local investors ${n_L}^i$ are relatively less. Hence, for any poor region i, presence of local investors* historically *is the primary determinant of the Government's effort for industrialization of that region.*

This result is very intuitive and a logical policy measure for any decision maker to follow, when it has the objective of developing all the regions under its jurisdiction equally. In a democracy, for any Government that's a normally expected presumption to begin with. In our framework, as the Government's objective was to maximise investments in all regions equally by optimal allocation of its effort, this result is intuitive that we witness in practical experiences, in the absence of any additional distortion.

5.6 Discussion and Conclusion

We briefly discuss some basic features of our model and some possible future directions before concluding this paper.
For past history to shape current investments, imperfections in capital markets must be the key, but this alone may not be sufficient as the concavity of investment returns guarantee convergence. The production functions we have taken in this paper are not concave, who's examples include investment activities with substantial fixed costs like business startups, nutritional or health investments, educational choices, migration decisions, crop adoptions etc. We consider the nonconvexities at the level of the country or the region as a whole, like Young's increasing returns on a grand scale, or economy-wide externalities described by Lucas-Azariadis-Drazen. This forms the basic tenet of our framework.

The need for foreign along with local investments for uplifting a backward economy is a settled debate among the policymakers now. In our framework, Foreign direct investment (FDI) plays a major role in the investment dynamics, along with the local investments. 1990s onwards, views among economists and Governments of developing countries considerably changed into believing that multinationals have important complementarities with local industry, stimulating growth and development in the host economies. There has been a rapid growth of foreign investments in developing and transition regions during the 1990s. The ratio of FDI inflows to GDP has increased from 0.8 percent in the late 1980s to 1.9 percent in the mid-1990s. FDI has linkage effects which can create complementarities and develop the local economy. Such a significant role of Foreign direct investment (FDI) arises because the host country, an underdeveloped one, has an investment opportunity that it cannot exploit by itself as its access to capital markets is restricted and it lacks the means and technical knowledge because of market incompleteness. This is in line with the idea pointed out by Kindleberger (1969). In such a scenario, a multinational corporation (MNC) is able to exploit such an opportunity because of owning the necessary capital, technology, and managerial skills.

An immediate extension can be to extend the model to explain the conditions under which a complementary role of local and foreign investments can be achieved. Other commonly observed political distortions can be added to the Government's motives and constraints to study their effects on investment and industrial policies. Our model also has an immediate scope to be

further strengthened and extended by consideration of economy-wide externalities, both in physical and human capital (Romer (1986), Lucas (1988), Azariadis and Drazen (1990)), which we didn't attempt here due to the limitation of the size of the paper.

In spite of the intuitive results and explanations, the primary limitation of this paper remains in the absence of an empirical investigation to support the findings. But as it deals with political democracies of underdeveloped countries in particular, the difficulty to access such data is understandable, especially when they contain various measures of Government's efforts. The indicators of such efforts may vary across countries also. For many countries or states within countries, the authors found any such data to be unavailable, which makes the task more practically challenging. This itself calls for a separate work altogether. The author intends to attempt these questions in a future work.

Chapter 6

Conclusion

This thesis falls at the crossroads of development economics and political science. Each of the three issues pursued in this thesis pertain to the socio-political realities of developing economies in particular. The results obtained in this thesis are relatable to the real life experiences of poor countries with democratic political systems. Hence broadly, this thesis equally contributes to the literature of development economics and political economy in significant proportion.

The models in this thesis paves the way for beginning a new kind of formal literature in development economics which can be extended in several directions. Each of the question that each chapter deals with has been studied from a new kind of political economic perspective which is novel in the current literature of economic development. For example, a game theoretic model of civil society activism in the context of land acquisition was never explored before formally. Similarly the issue of political violence as a signalling game in a clientelist setting is new to both the literature of conflict and clientelism. The political constraints on the Government for attracting investments has been a long issue of debate among policy makers which hadn't been attempted to be explained by such formal theory before.

To the best of our knowledge, application of Global Games on such three scenarios are also new in economic theory. The linking theme of collective action and coordination in three different set-ups show the generality and relevance of this behaviour in explaining different development outcomes. The generality of our proposed models lie in its scope and potential of applications to other scenarios as well.

Lastly, the results obtained in this thesis naturally call for empirical sup-

port and validations, which is a massive task in itself. Constrained by the size of this thesis and unavailabilty of data from the L.D.C.s on many accounts, we keep those attempts for our future work.

Appendix A

Appendix Title

A.1 Proofs

In this section, we present the detailed proofs of all the Propositions in order.

A.1.1 Proof of Lemma

As we are considering a representative activist, every activist thinks in this manner. Firstly we find the total participation size of the ideological civil society in the protest. As the proportion of activists who get a signal $s \geq \bar{N}$ will protest, their participating size will be a function of both μ_N and N. We define it as $a(\mu, N)$ and calculate to find it as

$$a(\mu_N, N) = \mu_N P(s \geq \bar{N}) = \frac{\mu_N}{2\epsilon} \int_{\bar{N}}^{N+\epsilon} ds = \frac{\mu_N}{2\epsilon}[N + \epsilon - \bar{N}] \tag{A.1}$$

Now, we compute the equilibrium behaviour of non-ideological activists, following the above discussed three distinct steps.

We start with the first step. Consider the representative non-ideological activist who has a belief that any other non-ideological activist will join the protest against the Government's project if and only if she gets a signal $s \geq \tilde{s}$. She also knows that a ideological civil society activist will protest if and only if she gets any signal equal to or more than $\bar{N}$. Given this knowledge and her belief about other non-ideological activists, what is the minimum signal received by our representative land loser such that she joins the protest?

The second step involves finding an answer to this question. Our representative land loser, receiving signal s, infers that the size of dissatisfied land

losers N lies in the interval $[s-\epsilon, s+\epsilon]$. She also knows that for any size $N \in [s-\epsilon, s+\epsilon]$, an agent observes a signal in the interval $[N-\epsilon, N+\epsilon]$. Given these inferences, our representative activist calculates that when the actual size of dissatisfied land losers is N, the proportion of activists receiving a signal at least as large as $\tilde{s}$ as

$$P(s \geq \tilde{s}) = \int_{\tilde{s}}^{N+\epsilon} \frac{1}{2\epsilon} ds = \frac{(N+\epsilon-\tilde{s})}{2\epsilon}$$

Hence, she perceives that total size of non-ideological activists joining the protest, denoted by $b(\mu_S, N)$ as

$$b(\mu_S, N) = \mu_S P(s \geq \tilde{s}) = \mu_S \frac{(N+\epsilon-\tilde{s})}{2\epsilon} \tag{A.2}$$

She knows that the project will get cancelled if the total size of the protest crosses the pre-fixed limit γ. This requirement boils down to

$$a(\mu_N, N) + b(\mu_S, N) \geq \gamma$$

which reduces to

$$\frac{\mu_N}{2\epsilon}[N+\epsilon-\bar{N}] + \frac{\mu_S}{2\epsilon}[N+\epsilon-\tilde{s}] \geq \gamma \tag{A.3}$$

Let $\hat{N}$ be that value of N for which the above inequality is satisfied with equality.[1] Given $\hat{N}$, her next job is to compare between the expected net benefit from protesting against the project or supporting it. Suppose she has received a signal s. Therefore she infers that N can take values up to $s+\epsilon$. The protest succeeds provided $N \in [\hat{N}, s+\epsilon]$. Hence for any signal s the project will not happen with probability

$$P(N \geq \hat{N}) = \frac{1}{2\epsilon} \int_{\hat{N}}^{s+\epsilon} dN = \frac{s+\epsilon-\hat{N}}{2\epsilon}$$

Where as the chances of success of the project is given by

$$P(N < \hat{N}) = [\frac{\hat{N}-s+\epsilon}{2\epsilon}]$$

[1]Equivalently, $\hat{\theta}$ can be that value of θ for which this condition is satisfied with equality, i.e. $\hat{N} = 1-\phi(\hat{\theta})$. We can also define here $\bar{\theta}$ as that value of θ which corresponds to $\bar{N}$, i.e. $\bar{N} = 1-\phi(\bar{\theta})$.

Consequently, the net benefit from joining the protest is greater than the net benefit from not joining if the following inequality holds.

$$\nu[\frac{\hat{N} - s + \epsilon}{2\epsilon}] < \nu[\frac{s + \epsilon - \hat{N}}{2\epsilon}] - \delta \tag{A.4}$$

Clearly, the left hand side of A.4 represents the benefit from actively supporting while the right hand side represents the benefit from protesting minus the net cost of protest. Let $\hat{s}$ be the signal for which the above condition is satisfied with equality. So, when the representative non-ideological activist gets the signal $\hat{s}$, she becomes indifferent between joining and staying away from the protest. But she protests against the project for all signal $s \geq \hat{s}$. In other words, given the belief $\tilde{s}$, the best response of the dis-satisfied land loser is $\hat{s}$. Substituting $\hat{s}$, the best-response signal, for s in A.4 and solving for $\hat{s}$ to $\tilde{s}$ from the above, we get

$$\hat{s} = \hat{N} + \frac{\delta\epsilon}{\nu} \tag{A.5}$$

It is important to understand that the best-response $\hat{s}$ is implicitly a function of $\tilde{s}$. Since $\hat{s}$ depends on $\hat{N}$ and $\hat{N}$ on $\tilde{s}$, therefore $\hat{s}$ depends on $\tilde{s}$.

The third step in arriving at the equilibrium is to put $\hat{s} = \tilde{s} = s^*$. Clearly if each unwilling land loser receives a signal at least as large as s^*, then none of them has the incentive to change her decision of joining the protest. We solve to get s^* as

$$s^* = \bar{N} + \frac{2\epsilon}{\mu_N}[\gamma - \frac{1}{2}(1 - \frac{\delta}{\nu})] \tag{A.6}$$

Let us define the equilibrium value of $\hat{N}$ corresponding to s^* by N^*. Substituting the value of s^* from A.6 in A.3, we can solve for the final expression of N^* as

$$N^* = \bar{N} + \frac{\mu_S}{\mu_N}\frac{\delta\epsilon}{\nu} + \frac{\epsilon}{\mu_N}(2\gamma - 1) \tag{A.7}$$

A.1.2 Proof of Proposition 4.3.2

We want to look at $\frac{\partial P(N<N^*)}{\partial \mu_S}$ and $\frac{\partial P(N<N^*)}{\partial \mu_N}$ at equilibrium.

Firstly, we look at $\frac{\partial P(N<N^*)}{\partial \mu_S} = \frac{\partial[1-F(\theta^* - c^*)]}{\partial \mu_S}$ which is equal to $-f(\theta^* - c^*)\frac{\partial \theta^*}{\partial \mu_S}(1 - \frac{\partial c^*}{\partial \theta^*})$.

Using the F.O.C. we get $1-\frac{dc^*}{d\theta^*} = \frac{R''}{R''+F''}$. Also, $\frac{\partial\theta^*}{\partial\mu_S} = -\frac{1}{\phi'}\frac{\partial N^*}{\partial\mu_S}$. By simple algebra, this gives us to examine $\frac{\partial[1-F(\theta^*-c^*)]}{\partial\mu_S} = f(\theta^*-c^*)\frac{1}{\phi'}\frac{\partial N^*}{\partial\mu_S}\frac{R''}{R''+F''}$. One can check that $\frac{\partial N^*}{\partial\mu_S} = \frac{\epsilon}{(1-\mu_S)^2}[\frac{\delta}{\nu}+(2\gamma-1)]$ which is clearly positive for $\gamma > \frac{1}{2}$. Hence, $\frac{\partial P(N<N^*)}{\partial\mu_S} > 0$ for $\gamma > \frac{1}{2}$.

Similarly, $\frac{\partial P(N<N^*)}{\partial\mu_N} = -f(\theta^*-c^*)\frac{\partial\theta^*}{\partial\mu_N}(1-\frac{\partial c^*}{\partial\theta^*})$ and we verify that $\frac{\partial N^*}{\partial\mu_N} = -\frac{\epsilon}{\mu_N^2}[\frac{\delta}{\nu}+(2\gamma-1)]$ which is negative for $\gamma > \frac{1}{2}$. This was implied from the sign of $\frac{\partial N^*}{\partial\mu_S}$ as $\mu_N+\mu_S = 1$.

Also, taking derivative of the F.O.C. w.r.t. μ_N, we derive $\frac{\partial c^*}{\mu_N} = \frac{F''}{F''+R''}\frac{\partial\theta^*}{\partial\mu_N} = -\frac{F''}{F''+R''}\frac{1}{\phi'}\frac{\partial N^*}{\partial\mu_N}$ which is positive for $\gamma > \frac{1}{2}$. Similarly, one can check $\frac{\partial c^*}{\mu_S} = -\frac{F''}{F''+R''}\frac{1}{\phi'}\frac{\partial N^*}{\partial\mu_S}$ to be negative for $\gamma > \frac{1}{2}$. Thus the role of ideological protesters has increasing effect on the compensation for *all* the land losers.

A.1.3 Proof of Proposition 3

The size of civil society joining the protest in equilibrium state now amounts to

$$\mu_p(N_0^*, s_0^*, \mu_s) = \frac{(1-\mu_s)}{2\epsilon}[N_0^*+\epsilon-\bar{N}] + \frac{\mu_S}{2\epsilon}[N_0^*+\epsilon-s_0^*] \tag{A.8}$$

Differentiating 3.20 w.r.t. μ_S, we get

$$P_1(\frac{\partial\mu_P}{\partial N^*}\frac{dN^*}{d\mu_S} + \frac{\partial\mu_P}{\partial s^*} + \frac{ds^*}{d\mu_S} + \frac{\partial\mu_P}{\partial\mu_S}) + P_2\frac{dN^*}{d\mu_S} = 0 \tag{A.9}$$

Also, from 3.22,

$$\frac{ds^*}{d\mu_S} = \frac{dN^*}{d\mu_S} \tag{A.10}$$

Substituting A.10 in A.9, we get

$$\frac{dN^*}{d\mu_S} = \frac{-P_1(\frac{\bar{N}-s^*}{2\epsilon})}{P_1(\frac{1-\mu_S}{2\epsilon})+P_2} \tag{A.11}$$

Also, from 3.22 we have $s^* > N^*$ and by assumption $N^* > \bar{N}$. Hence $\frac{dN^*}{d\mu_S} > 0$, implying $P(N \geq N^*)$ falls as μ_S rises, i.e. probability of industrialization rises like before.

A.1.4 Proof of Lemma 2

Hence, we can derive the size of ideological civil society joining the protest, which is equal to the proportion of them getting a signal $s \geq \bar{N} - \frac{(\alpha-\beta)\epsilon}{2}$. This can be calculated as

$$a'(\mu_N, N; \alpha, \beta) = \mu_N P(s \geq \bar{N} - \frac{(\alpha-\beta)\epsilon}{2}) = \mu_N[\frac{N + \beta\epsilon - \bar{N} + (\alpha-\beta)\frac{\epsilon}{2}}{(\alpha+\beta)\epsilon}]$$

Now, we calculate the size of non-ideological activists who will join the protest. A representative non-ideological activist starts with a belief s_0 that if other dissatisfied land losers receive a signal higher or equal to s_0 about the actual size of unwilling land losers after adjusting the political noise, then they will get down to protest. As each activist has a belief, each will think in the same way. Recall that the beliefs can take any arbitrary value and can vary for each of the activists. We arrive at the size of non-ideological protesters $b'(\mu_S, N; \alpha, \beta)$ who will be protesting against the Incumbent, as the proportion who are getting a signal equal to or more than s_0. That equals to

$$b'(\mu_S, N; \alpha, \beta) = \mu_S P(s \geq s_0 - \frac{(\alpha-\beta)\epsilon}{2}) = \mu_S[\frac{N + \beta\epsilon - s_0 + (\alpha-\beta)\frac{\epsilon}{2}}{(\alpha+\beta)\epsilon}]$$

Hence, for any N, the project gets abandoned *if and only if*

$$\mu_N[\frac{N + \beta\epsilon - \bar{N} + (\alpha-\beta)\frac{\epsilon}{2}}{(\alpha+\beta)\epsilon}] + \mu_S[\frac{N + \beta\epsilon - s_0 + (\alpha-\beta)\frac{\epsilon}{2}}{(\alpha+\beta)\epsilon}] \geq \gamma$$

Let this inequality be satisfied for $N = N'$. Thus, for any N, the probability that the development project gets cancelled is $P(N > N') = \int_{N'}^{s+\alpha\epsilon} \frac{1}{(\alpha+\beta)\epsilon} dN = \frac{s+\alpha\epsilon-N'}{(\alpha+\beta)\epsilon}$. There by, $P(N \leq N') = \frac{N'-s+\beta\epsilon}{(\alpha+\beta)\epsilon}$.

Now, the non-ideological activist can calculate her best response s' based on her belief s_0 from comparing her net expected benefit from protesting and supporting with the project. As a rational agent decides at the margin, she will be indifferent between protesting and not protesting when the expected benefits will equal, i.e. when

$$\nu P(N \leq N') = \nu P(N > N') - \delta$$

We can solve her Best Response $\hat{s}(s_0)$ from the above as

$$\hat{s} = N' - (\alpha - \beta)\frac{\epsilon}{2} + (\alpha + \beta)\frac{\delta\epsilon}{2\nu}$$

By substituting $s_0 = \hat{s}$ into the above equality condition of project getting dislodged, we can arrive at the corresponding threshold size of unwilling land losers

$$N^*(\alpha, \beta) = \bar{N} - \frac{\epsilon}{\mu_N}[\frac{\mu_S}{2}(\alpha - \beta) - (\alpha + \beta)(\frac{\mu_S\delta}{2\nu} + \gamma - \frac{1}{2})]$$

where as the equilibrium best response signal as

$$s^*(\alpha, \beta) = \bar{N} - \frac{\epsilon}{\mu_N}[\alpha - (\alpha + \beta)(\gamma + \frac{\delta}{2\nu})]$$

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