

Essays on Indian Economic Development and Political Change

by

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Abstract

Post independence Indian politics was dominated by one party, the Indian National Congress. The first serious challenge to the Congress emerged in the late 1960s, in the form of peasant parties in north India, the *Janata Party*. By the late 1980's the Congress had considerably weakened, and a new wave of parties emerged, this time based in ethnic identity, the right wing hindu *Bhartiya Janata Party* (BJP) and the low caste *Bahujan Samaj Party* (BSP). This thesis studies the role that economic changes played in the emergence of these parties and some economic effects of these political developments. The first research chapter empirically investigates the role of the Green revolution (adoption of new seed varieties) in the political mobilization of peasants and the emergence of the *Janata Party*. The emergence of the BSP led to the strengthening of the low caste political network. Access to this new network gave low caste people increased bargaining power over corrupt officials. The effect that this had is the subject of the second chapter. I find that the emergence of the BSP leads to increased influence of low caste households over corrupt officials and reduction in the bribes they pay. The last chapter studies the sharp increase in support for ethnic parties, the BJP and BSP, between the period 1989-96. It specifically investigates whether these increases were related to ethnic polarization. I uncover a positive relationship. During this time period more polarized districts experienced greater increases in the support for ethnic parties. The main contribution of this thesis lies in postulating and finding evidence for the relationship between economic and political changes in India in the recent past.

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Chapter 1

Introduction

Since independence India has gone through various political phases; from the dominance of the Indian National Congress (henceforth Congress), to the emergence of the the *Janata Party* and the peasant mobilization, and then to the emergence of ethnic parties in the early 1990's. Contemporaneous to these have been massive economic changes including the much discussed Green Revolution. This thesis aims to understand the relationship between the two. Did these economic changes play any role in the political developments? If so, how? And did the political mobilization of hitherto politically inactive groups have any impact on the subsequent economic outcomes of these groups, directly or indirectly?

The 1970s and 1980s witnessed large scale political mobilization of cultivators in north India, culminating in the electoral success of the *Bhartiya Lok Dal* (BLD), a North Indian peasant party . The second chapter in this thesis systematically evaluates whether the 'green revolution' (introduction of high yield variety seeds [HYV]) played a role in this mobilization, and if so how? Using panel data from the state of Uttar Pradesh (UP) for the period 1962-1989, I find that the districts that had the largest impact of the green revolution also had the biggest increase in the vote share of the BLD. This change comes about through a consolidation of the opposition to the dominant Congress party. An important contribution of this chapter is to provide evidence for how the green revolution affected politics. I postulate that by commercializing agriculture, technology adoption consolidates rural votes by aligning the policy preferences of previously disparate rural groups of rural voters and provide empirical evidence for this channel.

The role of economic development in the emergence and stability of democracies has been investigated by an extensive literature, since Lipset's work on the modernization theory of democracy (Lipset (1959)). Most of this literature is cross country in nature (Acemoglu and Robinson (2006); Acemoglu et al. (2008); Boix (2003, 2010); Huntington (1991)). Cross country studies cannot satisfactorily examine the channels through which this effect works. This chapter, by focusing attention within a country, provides evidence into the channels through which economic development can bring

about a more representative democracy. There is also a recent literature that looks at the link between human capital and political participation or mobilization Campante and Chor (2011b,a). The present thesis provides evidence on an alternative channel that can lead to political mobilization, namely, reduction in heterogeneity of preferences brought about by a technological innovation.

In this respect the results of the first chapter relate to an emerging literature that looks at how in a democratic setting diversity in policy preferences of a majority can hurt it and allow a minority to govern (Bandiera and Levy (2010)) and how changes in economic environment can result in political changes by aligning these preferences (Jha (2008)).

The idea that as individuals and groups prosper they desire more control over their political fortunes goes at least as far back as Tocqueville's "Democracy in America" ((De Tocqueville, 1863, p. 3))¹. The effect of economic changes on political institutions has been studied in different contexts previously (Acemoglu et al. (2005); North and Thomas (1973); North and Weingast (1989)). However, this chapter focuses on a developing country democratic setting.

Finally there is extensive work in political science on the political developments in India in the 1960's and 1970's (Weiner (1978, 1983); Frankel (1972); Brass (1980a,b); Duncan (1988, 1997); Baxter (1975); Frankel (1977)). This present chapter is more specific in focus, it looks at economic change caused by new technology and documents its effect on the political environment (a point which I believe does not receive adequate attention in the above work²). Also unlike this literature I systematically quantify the effect of technology adoption on political change. This chapter thus complements the above literature.

The weakening of the Congress over the 70's and 80's was one reason that allowed the emergence of a wave of ethnic parties (parties openly seeking support based on a religious or caste based rhetoric). One of these parties was the low caste *Bahujan Samaj Party* (BSP). In the third chapter I look at an indirect economic impact of this low caste mobilization. When deal-

¹ *Whilst the kings were ruining themselves by their great enterprises, and the nobles exhausting their resources by private wars, the lower orders were enriching themselves by commerce. The influence of money began to be perceptible in state affairs. The transactions of business opened a new road to power, and the financier rose to a station of political influence in which he was at once flattered and despised.*

-Alexis de Tocqueville ("Democracy in America")

² Duncan (1997); Baxter (1975); Frankel (1977) are notable exceptions, but these studies rely on broad correlations to draw their conclusions

ing with corruption, agents can either bribe the official or use their caste networks to gain access to politicians who can intervene with the corrupt official on the agent's behalf. A change in law in 1994, reserving seats in local government, along with this broader low caste mobilization enhanced the network of low caste politicians in a traditional setting where such positions were monopolized by high castes. Increased access to this new network should have resulted in a lowering of bribes being paid by low caste agents, if bribe and access to politicians are indeed complements. In the third chapter I provide evidence for this using data on bribes paid to obtain loans under a subsidized credit scheme, the Integrated Rural Development Program (IRDP).

Two strands of literature come closest to this chapter. The first is one that looks at caste affiliation and provision of public goods. Using data from South India Besley et al. (2004) find that for low spillover public goods Scheduled Caste(SC) households benefit when they live in a *Gram Panchayat* (GP) with SC pradhan. Bardhan and Mookherjee (2006) using data from West Bengal find that in intra village allocation of public goods lower castes and poor are not discriminated against, but in inter village allocation villages with a higher proportion of poor and lower castes receive less public goods.

Secondly there are papers which look at impact of the rise of the BSP (Banerjee and Pande (2009); Munshi and Rosenzweig (2008)). Using survey data from Uttar Pradesh (UP), Banerjee and Pande (2009) find that over the last two decades as ethnic voting has increased so has the level of political corruption. They suggest that this is because voters face a trade-off between candidate quality and ethnicity and are willing to choose a bad quality candidate if she is from the "right" caste. In this chapter I provide indirect evidence of the impact of the mobilization strategy of BSP on economic outcomes of low caste voters.

Subsidized credit programs have been the subject of a number of studies (see Buttari (1995), Besley (1994); Morduch (2000)). In the Indian context the IRDP has been the subject of a huge literature dealing with the efficacy of poverty alleviation schemes (Pulley (1989); Dreze (1990); Swaminathan (1990); Seabright (1989, 1991); Dantwala (1990)). A problem identified in most of these papers is that of mis-allocation of loans and poor targeting of subsidies. There seems to be a general consensus that the biggest beneficiaries of subsidized credit are the wealthier farmers, not the poorer ones. This chapter though not aimed at evaluating the IRDP, does indicate that the effect of corruption is indeed a crippling problem and effects different castes differently.

In this respect this chapter ties in closely with the vast literature dealing with caste inequalities in India (Deshpande (2000, 2001)). This paper also relates to a burgeoning literature talking about traditional social systems shape current economic realities in India (see Munshi and Rosenzweig (2006, 2009); Luke and Munshi (2007)).

The fourth chapter of the thesis aims to understand the sudden rise in ethnic voting in north India in the early 1990's particularly The success of the ethnic parties, the low caste BSP and the right wing Hindu party, the *Bhartiya Janata Party* (BJP). This success was not gradual, each of these parties almost doubled their vote shares from one election to the next. In particular I am interested in the relationship between ethnic polarization, as a measure of antagonism between different groups in society, and the increased incidence of ethnic voting. Using data from three states in north India from the 1989, 1991 and 1996 election, I exploit the variation in change in vote share of these parties across districts to find the relationship between polarization and increase in vote shares of these parties. I provide evidence that the vote share of both the BJP and BSP increases more in more polarized districts.

Increase in ethnicization of politics in India in the past two decades has begun to draw increasing attention from economists and political scientists alike. A series of recent papers in economics look at the effect of ethnic voting on candidate quality, the increase in violence and corruption in politics and in general at how ethnic identification effects the ability of voters to choose the right candidate or discipline the politician once he is in office (Banerjee and Pande (2009), Banerjee et al. (2010), Banerjee et al. (2011)). These papers advance incomplete information or the ability of ethnic networks to force politicians to commit to policy as the reason for ethnic voting. The third chapter provides another reason, competition between different groups for control over the state machinery in a setting of a patronage democracy (see (Chandra, 2004b, p.6)).

This chapter draws on a large literature in conflict studies that has investigated the link between measures of distributions of ethnic groups in societies to the incidence and intensity of ethnic conflict (see for example Esteban and Ray (1994), Esteban and Ray (2008), Montalvo and Reynal-Querol (2005b), Horowitz (1985), Collier (2001)). Polarization as a measure of competition or conflict between groups has been shown in this literature to be positively correlated to conflict.

Finally, this chapter also informs a vast literature in political science on the political developments in India in the last two decades, specially the rise of the BJP and BSP (see Chandra (2004b), Ludden (1996), Chhibber

(2001)). I complement this literature by providing empirical evidence on how ethnic polarization led to the rise of the ethnic parties in India, and also that the rise of the BJP and BSP are inextricably linked.

Chapter 2

Technological Change and Political Mobilization

The peasants have started to flex their muscles that their economic betterment has given them....In national terms [they] cannot claim [that] they have received a raw deal. Witness the manner in which agricultural inputs have been subsidized for the past two decades....But it is precisely because the farmers have been enabled to move beyond subsistence economy that they have acquired the capacity to launch the kind of sustained struggle that they have. (The Times of India, Editorial, Feb. 1988)

Introduction

The question of whether there is a link between economic development and emergence and stability of democracies is of long standing interest in the social sciences. The existing literature ³ on this question uses cross country data to uncover evidence of a positive relationship between levels of economic development and presence of democratic institutions in a country. Cross country data can provide limited evidence on channels through which development enhances levels of democracy in a polity.

This chapter tries to address this concern by focusing on political developments within a country. Using an episode of mass scale technological introduction in Indian agriculture it tries to understand how economic changes can lead to political changes within a democracy. The specificity of the institutional setting (India is a democracy with regular elections) allows us to uncover the channel through which, in this particular case, economic development effects political institutions.

The 1970's and 80's witnessed large scale political mobilization of cultivators and rural voters in India, at that time a young democracy which until then had been politically dominated by urban interests. This mobilization

³ Acemoglu et al. (2008); Boix (2010) are recent contributions.

was reflected in the emergence of political organizations, both electoral and non electoral and in the increasing presence of politicians with an agricultural background in all political parties. An extensive literature in political science⁴ has discussed the role that a key innovation in Indian agriculture, namely the introduction of High Yielding Variety (HYV) seeds (popularly called the green revolution), played in this mobilization. This chapter systematically studies the political developments in north India ushered in by the mass introduction of this new agricultural technology beginning in the mid 1960's. Using panel data from northern India I document the impact of the spread of the technology on the emergence of a new, rural interest based, political party (the *Bhartiya Lok Dal* or BLD).

Indian politics for the first two decades after independence was dominated by the Indian National Congress (henceforth Congress). The Congress won 72.07% of the seats in the first five parliaments. What was perhaps surprising was that its average vote share over these five elections was however only 44.4%⁵. Even these simple averages reflect the fragmentation in the opposition to the Congress. Voters turned out to vote against the Congress, but their votes got split between different smaller parties. This changed when starting in 1969, with the formation of the BLD⁶, the cultivators and rural voters started mobilizing against the mostly urban Congress (see Figure 2.1).

In this chapter I argue that part of the reason for that mobilization can be traced to the introduction of new HYV seeds that were rolled out on a massive scale in the wheat growing regions of northern India, starting in 1965-67. I use a panel of 48 districts from the state of Uttar Pradesh (UP) that I observe over 7 elections from 1962-89. Owing to differences in historical institutions and geographical features different districts adopted the new seeds at different rates. This between district variation over time allows me to use a generalized difference-in-difference framework that controls for unobserved district and time effects to estimate the impact of the spread of HYV technology on the emergence of the BLD. I find that a 10 percentage point (p.p) increase in the proportion of wheat area in a district planted under HYV seeds results in a 1.5 p.p. increase in the vote share of the BLD and a 2.5 p.p increase in its seat share. This increase is accompanied by a *fall* in political fractionalization⁷ but there is *no* change in voter turnout

⁴See for example Varshney (1998); Weiner (1978, 1983); Duncan (1988, 1997)

⁵These are numbers for the whole of India, the numbers from my sample of states are very similar.

⁶The political details and background are discussed in a later section.

⁷Fractionalization in district $i = 1 - \sum_j \text{Voteshare}_{ij}^2$, where j indexes candidate or

or Congress vote share. Together these results confirm that a consolidated opposition to the Congress party emerged, in the form of the BLD, following the introduction of new agricultural technology.

The results are robust to the inclusion of various controls that allow me to discount possible alternative explanations and restricting the estimation to various sub-samples. The results from the fixed effects estimation are consistent only if there is no third variable driving the trends in both HYV adoption and political changes. Including various controls increases confidence in the proposed explanation, it however does not completely resolve the issue. Thus to address concerns about omitted variables and reverse causality, I instrument for adoption of technology using the proportion of irrigated land in that district in 1931 interacted with a dummy which is 0 pre-HYV introduction (i.e before 1965) and 1 post HYV introduction. The IV results confirm the pattern of results obtained from the fixed effects OLS estimations.

I construct a falsification test using the electoral outcomes of the communist parties as a dependent variable. The communist party's support comes mostly from urban industrial workers and should not have been systematically affected by the green revolution. Regression estimates confirm this, there is no effect of the spread of HYV seeds on communist party vote or seat share.

I then propose an explanation for the effect of HYV adoption on political mobilization. The new technology increased the level of commercialization in Indian agriculture. As more cultivators became engaged in commercial farming (as opposed to subsistence farming that was practiced previously), they were unified by a policy demand for higher farm output prices⁸. Also the new technology depended more heavily on market obtained inputs compared to traditional farming practices; a demand for more input subsidies and availability of subsidized credit was another key demand of the BLD (see Varshney (1998); Weiner (1978, 1983)).

The green revolution thus aligned the policy preferences of previously disparate groups of rural voters. I employ a novel empirical strategy to provide evidence for the above channel. Using caste data from the census of 1931 I construct district level caste fragmentation. I then find that similar levels of HYV adoption have **larger** impacts on BLD vote share in less fragmented districts as compared to more fragmented districts. This is con-

political party.

⁸Agricultural prices in India are heavily influenced by government policy as the government sets a price floor for agricultural output.

sistent with the above story, as it is more difficult to align preferences in more fragmented districts. The new technology also had larger impact on cultivators with larger landholdings. Using within district inequality and using the same empirical strategy as with caste fragmentation I find that the impact of HYV technology on BLD share was **larger** in more unequal districts.

The final empirical section of the chapter investigates whether there were any policy changes that resulted from the substantive political changes discussed above. First I document that changes in macro development policy were consistent with the rise of the BLD and mass rural mobilization. The emergence of a rural party was also reflected in changing policy stands of *all* political parties. Secondly, I look at changes in provision of public goods at district level between 1971 and 1991. Using a diff-in-diff strategy I find that a 10 p.p increase in BLD vote share in a district resulted in about a 1 p.p increase in proportion of villages in the district that had a primary or middle school and a 0.1 p.p increase in the proportion of villages with a high school. I focus on schools as the literature has previously documented the increasing returns to schooling with advent of the green revolution (Foster and Rosenzweig (1996)).

The rest of the chapter is organized as follows. Section 1 discusses the political background of the study in some detail, section 2 describes the setting of the study, section 3 describes the data and construction of variables, section 4 presents the empirical framework, estimation results and discussion, section 5 provides concluding comments.

2.1 Background

2.1.1 Political background

For the first two decades after independence from colonial rule in 1947, politics in India was dominated by the Congress party and its stalwart leader Jawaharlal Nehru, India's first prime minister. Political scientists have called the Congress an "umbrella" party, containing in its folds many disparate caste, class and religious groups. In the context of this chapter, there is one feature of the Congress of the 1950's and 1960's that is of particular interest. This was the tussle between the urban and rural sections of the party to wrest control of policy making.

The central leadership of the party, along with Nehru, was very much urban, elite and left leaning ideologically. They were socialists in outlook and promoted heavy industrialization through state controlled industries as

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the means to development and growth. The role of agriculture was to provide food for the newly industrializing country, thus the food prices had to be kept low which resulted in anti producer policies⁹. Agricultural output could be increased, not through price incentives, but increase in efficiency through institutional reforms such as land reforms and more secure land tenure for cultivators, farm and service co-operatives and local self government at the village level.

Their power was countered by the so called “state bosses”, who were mostly rural leaders themselves and were very aware of the difficulties in implementing the institutional reforms because of existing entrenched interests. Also the interests they represented were the landed classes in the rural areas, thus they argued for more producer friendly agricultural prices. However as long as Nehru was alive India’s development policy firmly remained pro urban and pro industrialization.¹⁰

The death of Nehru in 1964, and exogenous shocks to the Indian economy (these are discussed in the next section in more detail) prompted a shift in agricultural policy, and it became increasingly producer friendly. An agricultural prices commission (APC) was set up to decide the minimum procurement price so that the producers would not suffer in the event

⁹The role of the state in determining the input and output prices for agriculture was and remains big. On the input side because of the heavy subsidies that it provides. On the output side because it promises to buy for the PDS any quantity of grain at a pre set procurement price. This effectively sets a price floor. The argument of this group can be summed up in this quote by A.P Jain, food minister between 1953-57 ((Varshney, 1998, p. 34)):

There is...a school of thought in this country consisting of economists and persons confined to their rooms. They think that you can finance the Plan by depressing the agricultural prices. Some of them go to the length of saying: “fix the price of wheat (at a very low level) and the price of rice and other agricultural commodities compulsorily in the market and that will solve the problem of prices. Wages will not go up and the plan will progress smoothly.” These people seem to forget that there is some such thing as agricultural sector in our economy and it all forms part of the Plan....If we adopt any policy of low prices for agriculture, it is a regressive policy. If our policy does not give incentive to the farmer, he is not going to produce and if the Plan fails it will wreck on the policy of depressing agricultural prices.

¹⁰The present literature says that this had more to do with Nehru’s political stature and charismatic leadership than anything else. (Varshney, 1998, p. 30) calls him the “supreme leader of the masses”, and the the state bosses required “Nehru’s national stature and supreme popularity” to win national elections. But as the results of this chapter show that it may partly have to do with the difficulty of the leaders to mobilize rural classes at the time, which later became easier with the introduction of HYV.

of a plentiful crop. This is the price at which the government promises to buy any quantity of grain for its public distribution system (PDS). Along with the price incentives new agricultural technology was also introduced (in the form of HYV seeds) and the agricultural extension services were extended to greater parts of India (this meant more investment in agriculture, particularly in imports of seeds and fertilizers and setting up fertilizer plants, rather than industry which would not have been possible under Nehru's policies.).

The increased prosperity of cultivators following this shift in policy was soon reflected in politics. Five years after the death of Nehru fissures began to appear in the Congress. Prominent among the leaders who split from the party was Charan Singh, a peasant leader of the *jat* agricultural caste from western UP, who in 1969 formed a party called the Bhartiya Lok Dal (BLD). The BLD was a party with powerful following among the peasants in the wheat growing regions of North India, and was the chief constituent of the Janata party which came to power in 1977 with Charan Singh as the home minister.

Charan Singh was a powerful agrarian ideologue, with a strong opposition to heavy industrialization and belief in the defense of peasant proprietorship in agriculture¹¹. The BLD was organized around a demand for higher producer prices from the APC, changing the composition of the APC to include more agriculturalists (politicians with rural backgrounds) rather than technocrats, cheaper agricultural inputs through more subsidies, cheaper credit and larger allocation of public resources to villages (roads, schools, drinking water facilities).

When the Janata came to power in 1977 with the BLD as its biggest component, these views were very clearly reflected in its policy. "The relative neglect of the rural sector has created a dangerous imbalance in the economy. The farmer has been consistently denied reasonable and fair prices for what he produces. Allocations for agriculture and related development have been grossly inadequate and the need for improving conditions in the villages has received scarce attention." (Varshney, 1998, p. 104) The Janata government did not survive long, but by 1980 peasants had been mobilized and the political environment had changed substantially to accommodate them. As (Varshney, 1998, p. 138) shows all political parties began to adjust their policy stands to reflect the increasing power of rural India. The

¹¹The following taken from Charan Singh's writing reflects his political ideology: "Political power lies in the hands of the urbanites to whom urban interests naturally come first." "To the town dweller he," he added "the farmer was a mere grist in the mill of economic progress on whose bones the structure of heavy industry was to be reared." ((Varshney, 1998, p. 103))

Congress party manifesto in 1971 and 1977 did not contain any references to agricultural prices. The 1980 election manifesto promised that “greater attention [will be] paid to the farmer’s cost structure” and “input cost indexation of support prices will be instituted so as to safeguard the farmer’s income from inflationary trends.”

2.1.2 The green revolution

This section expands on the policy discussions surrounding the change in India’s agricultural policy in the mid 1960’s, with the aim of understanding the reasons for the change in policy and the factors which influenced the rolling out of the new HYV seeds. This is important to understand the empirical framework used later and interpret the results.

By the beginning of the 1960’s Indian agriculture was in a dire state. Lack of infrastructure; scarcity of inputs like improved seeds, fertilizers, pesticides and equipment and a confused agricultural policy had resulted in stagnated output in the face of an increasing population. This had made the country more dependent on imported wheat than ever before (Varshney (1998); Frankel (1972)).

Indian agricultural policy at the time was committed to two irreconcilable aims: to achieve maximum increases in agricultural output and reduce regional disparities. The emphasis on reducing disparities between regions (and sometimes within regions) meant that the scarce inputs were not applied to their most productive uses¹². The selection of methods for agricultural development was also influenced by the social aim of reducing disparities. Secondary importance was given to the introduction of costly modern inputs as a means of increasing agricultural productivity. Instead priority was to be given to achieving large scale institutional change: implementation of land reforms, including security of tenure, lower rents, transfer of ownership rights to tenants, and redistribution of land¹³. The pace of

¹²As this would have meant providing them in regions with good irrigation and institutions (Frankel (1972)). The first Community Projects in 1952 were allocated only to districts with assured water from rainfall or irrigation. This program however soon ran into difficulties because objections were raised to the practice of “picking out the best and most favourable spots”. Within a year the principle of selective and intensive development was abandoned. Instead the Planning Commission announced a program for rapid all India coverage under the National Extension Service and Community Development Program.

¹³According to the father of Indian planning P.C Mahalanobis, planners devised programs based on “intensive cultivation of land by hand-and improving conditions of living in rural areas through community projects, land reforms, consolidation of holdings, etc.”

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these reforms was understandably slow as the legislature and the executive arms were both dominated by the landowning classes.

By the late 1950's and early 60's stagnant growth rates in agriculture had become a serious limiting factor on the overall rate of economic growth. The situation was not helped by two severe droughts which led to famine like conditions. The country had become increasingly reliant on cheap grains imported from the U.S, the continuation of which was in jeopardy in light of an imminent government change in that country¹⁴.

By the early 1960's the planners were convinced that the continuing shortfalls in agricultural production had the potential to jeopardize the program of industrial development. In 1964, they announced "a fresh consideration of the assumptions, methods, and techniques as well as the machinery of planning and plan implementation in the field of agriculture". Policy was changed in two important ways. First, development efforts were to be concentrated in cultivated areas with an assured supply of water which created "fair prospects of achieving rapid increases in production", and second there would be a "systematic effort to extend the application of science and technology" including the "adoption of better implements and more scientific methods" to raise yields¹⁵.

In 1961, 15 districts across the country¹⁶ had been taken up under a pilot scheme, the Intensive Agricultural Development Program (IADP) (Desai (1969)). Pioneered by the Ford foundation¹⁷ IADP placed emphasis on providing the farmer a complete package of inputs to increase yields, including credit, modern inputs, price incentives, marketing facilities, and technical advice. In October 1965, the program was extended to 114 districts (out of 325) under the name Intensive Agricultural Areas Program (IAAP).

The attempt to improve yields through this change in policy was bolstered through an almost simultaneous technological breakthrough. This was the development of improved varieties of paddy and wheat reported from Taiwan and Mexico. The new varieties were more resistant to plant

¹⁴Wheat was being imported under agreement PL-480 concluded under Kennedy. This agreement was to run out in June, 1965 and its continuation was suspect as President Johnson had reservations about it. Eventually Johnson did continue the wheat exports, but they were put on a "short tether" and wheat was released on a month-to-month basis rather than year-to-year.(Varshney (1998))

¹⁵See Varshney (1998) for the detailed political mechanics behind this decision

¹⁶The districts were Thanjuvar (Madras), West Godavary (Andhra Pradesh), Shahabad (Bihar), Aligarh (Uttar Pradesh), Ludhiana (Punjab), Pali (Rajasthan), Alleppy and Palghat (Kerala), Mandya (Mysore), Surat (Gujarat), Sambalpur (Orissa), Burdwan (West Bengal), Bhandera (Maharashtra) and Cachar (Assam).

¹⁷Ford foundation was also instrumental in beginning the initial HYVs to India.

diseases and more responsive to fertilizers and chemical inputs. Two initial varieties of wheat imported from Mexico, Sonora 64 and Lerma Rojo 64A were found to be particularly well suited to Indian conditions. They were crossed with local varieties and released for mass distribution in 1967. The new seeds needed the kind of package of inputs that was already being provided in the IAAP districts, hence these varieties were phased in starting with these districts using the same extension concepts embodied in the earlier project.

The above discussion shows that the timing of the introduction of the HYVs is plausibly exogenous. It was constrained by the availability of technology, which was imported into India. The change in policy that resulted in the rather quick adoption of the new technology was necessitated by the worsening economic condition in the country. The regional disparities in the timing and extent of adoption had to do with the existing institutional and natural endowment differences, with more productive regions getting the technology first, rather than political considerations. I discuss this point further in the next section where I discuss the geographical setting of the study.

2.2 Setting of the study

Politics in India is very regional, with dissimilar trends for different states and regions in the country. Leading political scientists who have worked on India have stressed the importance of looking at sub-regional data to find meaningful results¹⁸. In this chapter I look at UP. This choice is guided by several reasons; UP shows regional variation in the adoption and use of the new technology, but more importantly it was the also the birthplace of the Janata Party, the new rural party that emerged in north India. It was the first serious challenge to the hegemony of the Congress

UP comprises almost half of the northern Indian Gangetic plain. Wheat and rice are the major food crops grown in the state. Wheat is planted in all districts whereas rice is planted mostly in the eastern part of the state. Along with Punjab and Haryana, western districts of UP, being the most productive wheat growing region, were chosen for the initial phase of introduction of the new HYV seeds, however the technology eventually

¹⁸“*National* correlations for India rarely produce any interesting findings. Strong correlations are procured only for smaller units-either the state or a region of the state...Local factors often play such an important role in voting that neither aggregate election data nor national surveys convey a satisfactory picture of why and how Indians vote as they do.”(Weiner (1983))

2.2. Setting of the study

spread to the other parts of the state. The increases in agricultural yields obtained through the adoption of the new technology were as impressive in UP as elsewhere in India (see Figure 2.2). Figure 2.3 plots wheat yield (in tons/ha) in a given district in a given year against the proportion of wheat area in that district that is planted under HYV wheat. There is a strong positive correlation between the two variables and this is robust to inclusion of a time trend.

Due in part, but not entirely, to its sheer size, UP sends 85 out of the 540 elected members to the Lok Sabha, UP has had great political value both really and symbolically. It is the core of what is referred to as the north Indian ‘Hindi heartland’(Jeffery and Lerche (2003)) and has played a central role in the political developments in the country. The demise of the Congress, the formation of modern farmers and peasants into a political force from the late 1960’s, the emergence of the Hindu Nationalist *Bhartiya Janta Party* and the latest low caste movement spearheaded by the *Bahujan Samaj Party* were all taken seriously at the national level only after gaining importance in UP.

Despite the relative homogeneity of the state¹⁹, the modern state boundaries are a recent creation by the British and encompass regions which were under different administrative and institutional setups historically. The effect of these institutional differences can still be seen in the economic performance of the various regions of UP.

Geographically UP shows substantial north-south differences with the mountains in the north giving way to the fertile alluvial plains in the center and then the dry plateau in the south. From the east to the west the differences are man made in nature, with historical institutions specially those concerning land tenure resulting in lasting economic differences²⁰.

The advent of the green revolution made these differences more apparent²¹ with the already more productive districts in the west being better able to take advantage of the new technology²². Figures 2.4 and 2.5 show

¹⁹The state reorganization commission of 1955 decided that no changes were needed to the boundaries of UP as “UP forms the citadel of Indian civilization, that UP is homogeneous, and that a large size will lead to economy in administration.”

²⁰The different land tenure systems arose from the different British revenue settlements in the two regions. These in turn depended a lot on when British took control of the region. The eastern parts, districts surrounding Varanasi, came under British control a little earlier than the west.

²¹Also while these regional differences may have been some cause of concern during Colonial times, such regional differences were an anathema to the planners in modern India which made them prominent topics in policy discussions.

²²This has been documented in the literature before, see Banerjee and Iyer (2005)

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the process of adoption of HYV wheat and the wheat yields in different regions of UP. The adoption rates over the 20 year period show considerable differences, with the rates being highest in the west and lowest in the plateau Bundelkhand region. However the proportion devoted to HYV in the 3 regions of the fertile alluvial plains is very similar with about 85% of the cultivated area being under the improved varieties by the end of the period of study. It is in productivity (Figure 2.5) however that the differences really start showing up. The yields in the western districts are easily much higher than in the rest of the state throughout the 30 year period. Towards 1985-86, when the data end, the yields are about 1 ton/ha higher in the west than in the central or eastern districts, which given that the yield is about 2 tons/ha in the east and central region is about 50% more. Also what is clear from the graph is that districts which were more productive *before* the green revolution were also better able to take advantage of the new technology²³. Even the central region which was marginally better off than the east to start with remains marginally better off right upto the end of the period. Lastly, not only is the west more productive than the rest it is *even* more productive than it was before green revolution. The increase for the west is steeper than it was for the rest.

The earlier theories about the relative prosperity of western UP stressed the role of demographic pressures and land holding size, but evidence does not support this hypothesis (Sharma and Poleman (1993)). The now widely accepted arguments stress the role of the prevailing land tenure system and the development of canal irrigation in the west and not in the east (Stokes (1978); Stone (1984)).

The lasting impact of historical land tenure systems in India is well established (Banerjee and Iyer (2005)). The eastern part of the state which came under British control earlier than the west experienced the Permanent Zamindari Settlement, while the western districts mostly experienced the *Bhaichara* system. The Zamindari settlement involved rentier landlords and several strata of tenants and sub-tenants, almost completely alienating the cultivators from the land. Sub tenants were frequently traders and moneylenders who acted as middlemen forcing cultivators to sell their produce at a lower than market rate on account of indebtedness (Sharma and Poleman (1993)).

More secure tenancy rights encourage more investment in agriculture,

²³This is not very surprising, since the two technologies the old and the new are very similar in terms of inputs they need. A very crude way of putting it is that the new technology just needs those inputs more intensively.

2.3. Data

both private and public. The differences were noticed at that time as well; one canal engineer remarked upon the “rapid extension of irrigation in the villages owned by the *Bhaichara* communities [while] where the land belongs to large *zamindar* the increase if any is slight. Apparently cultivators in *zamindari* villages were afraid that landlords would use the advent of canal irrigation to enhance their rents and deprive them of *maurusi*²⁴ rights” (Stone (1984)).

Most of the public investment in irrigation in the 19th century was in western UP. The economic impact of the spread of irrigation was perhaps more indirect rather than direct. Increasing yields from canal irrigation resulted in increasing commercialization of agriculture and the development of specialized non-agricultural support services like carting, milling and draft cattle rearing. Thus the agricultural setup in the western districts was already much better adapted to handle commercial agriculture than the rest of the state at the turn of the century.

Another important impact of the commercialization of agriculture was development of good market facilities in the western districts. The rest of the state which had low marketable surplus was served by periodic village markets (*painths*) and by small market yards. They lacked the large scale market yards (*mandis*) that developed in the western districts. These larger markets with standardized markets were more efficient and less costly to cultivators (Sharma and Poleman (1993); Stone (1984)).

2.3 Data

2.3.1 Economic and demographic data

The primary source of the data used, is the India Agriculture and Climate Data Set prepared by Sanghi et al. for the World Bank. These data build on an initial data set compiled by James McKinsey and Robert Evenson at Yale. The data set contains information on a number of variables for agricultural productivity and investment for 217 districts of India (which cover 13 major states) for the agricultural years 1957/58 through 1987/87. This chapter uses data for the 48 districts from the state of UP. Panel A of Table 2.1 shows the summary statistics for the economic and demographic variables used in the chapter.

As previously discussed wheat is the major crop planted in UP, with only a few eastern districts growing rice. Thus the proportion of wheat area

²⁴*Maurusi* means occupancy status.

2.3. Data

under HYVs grows rapidly to about 45% within 5 years of the introduction of the technology and to 80% within 15 years. A majority of agriculturally important districts (those lying in the central plains) have all their area under HYVs. As a contrast the proportion of rice area under HYVs is only about 15% after 15 years. This reflects two things, first in only 14 districts in eastern UP is rice a major crop (although all districts grow some rice, the acreage in most districts is very low). This can be seen in row 4 of the table which shows the average proportion of rice growing area under HYV conditional on the district having a non zero proportion. The average value of the proportion goes up significantly, but is still substantially less than the wheat area under HYV growing to about 50% by 1981. This leads to the second point, that while initial improved varieties of wheat were robust to Indian growing conditions and had higher yields the new varieties of rice were not. They were sensitive to soil conditions and farmer inputs, which delayed adoption of rice varieties by growers (Munshi (2004)). Thus in this chapter I use adoption of new wheat varieties as my explanatory variable.

On a whole all these variables show clear upward time trends. The increase in wheat yields is a lot more impressive than that in rice yields. Wages increase almost 400% over this period. The instrumental variable used in the chapter requires information on proportion of irrigated land in each district in 1931. I constructed this variable using the 1931 census of India.

2.3.2 Political data and variables

The election data are taken from the detailed election reports published after every election by the Election Commission of India²⁵. This chapter uses 7 election years covering all elections held between and including 1962 and 1989 (parliamentary elections held in 1962, 1967, 1971, 1976, 1981, 1984 and 1989). The published reports contain detailed election results for each of the 85 parliamentary constituencies in UP (86 for 1962 elections). The reports have information on candidates; their party affiliations, vote share of each candidate, the total number of electors in the constituency and the voter turnout.

I use two complementary sets of political outcome variables to make my case. First, I use the vote and seat shares of the relevant parties, i.e the dominant Congress party and the new rural based BLD to look at the performance of these parties to see if these systematically relate to the spread

²⁵Downloaded from http://eci.nic.in/eci_main/StatisticalReports/ElectionStatistics.asp

2.3. Data

of HYV seeds. Second, I use standard measures to sum up the distribution of votes, to understand the political change in terms of party fragmentation.

The Congress party split in 1980 into Congress(I) and Congress(O). Congress(I) was the successor of the legacy of the united Congress party (Weiner (1983)) and it is the vote share of this party that I use as the Congress vote share after 1977²⁶. The BLD vote share includes vote shares of the Swatantra party for the 1962 and 1967 elections, the BLD and Swatantra party for the 1971 elections, the BLD in 1977, 1980 and 1984 (the two parties merged in 1974) (see Weiner (1978, 1983) for more details) and Janata party in 1989. These were not the only parties contesting elections in UP during this period, but the Congress was the dominant party and the party that all opposition was aimed at. The BLD represented the middle peasants and cultivators²⁷, the protagonists in this story. Thus I look at the vote shares of these two to document the political changes. Another advantage of using data from the state of UP is that the pro-rural political party is easily identifiable.

Using the vote shares of different parties I construct the party fractionalization index,

$$1 - \sum_j Voteshare_{ij}^2$$

where i indexes political constituency and j the candidate (or political party). The fractionalization index is a widely used measure of political competition (Banerjee and Somanathan (2007)). In fact, most of the commonly used measures of political competition are Herfindahl index based measures, see for e.g Chandra (2004b). In the case of multi-party competition the above index is a very intuitive way of measuring competition as it gives a direct measure of how fragmented a polity is. An increase in the index means a more fragmented political setup. To increase confidence in the results I also use

$$1 - \max_j (Voteshare_{ij})$$

where as before i indexes political constituency and j the candidate, as an additional measure of political competition²⁸ The less dominant the winning

²⁶Congress(O) perished soon after while the other Congress is still very much active in Indian politics

²⁷The notable absentees here are the Jansangh a right wing Hindu nationalist party and the Communist party of India (CPI). The Jansangh represented mostly urban middle class interests and the CPI had some support from rural landless wage workers but was mostly an urban trade union party. None of these two groups are of direct concern to this chapter.

²⁸I have used other measures of competition; plurality, which is the difference between

2.3. Data

party, the higher is this measure. Voter turnout in a constituency is used as a measure of political participation.

Political constituency(PC) boundaries and administrative districts do not always coincide in India. During the period of study there were 51 districts in UP but 85 PCs. I match the PCs to the respective districts they fall in and then aggregate the political variables to the district level. Additional details about the construction of the data are contained in the appendix. Some previous work using both political and administrative boundaries has taken an alternative route, (see Banerjee and Somanathan (2007)) by disaggregating district level data onto the constituency level. The introduction of HYV seeds was administered at the district level, hence I believe a district is the appropriate level of analysis when adoption of technology is the explanatory variable. Another advantage of using districts as units of observation is that district boundaries did not change much during the period of the study, as discussed below.

Panel B of Table 2.1 contains summary statistics on the political variables. All these variables except fractionalization, which is of course an index, are expressed as proportions. There is no clear discernible time trend in these unconditional means, except the vote share of the *Janata* party²⁹ which increases over time.

An important caveat about interpreting the results in this chapter is that while district boundaries do not change over the course of the period studied in this chapter, PCs were reorganized twice during the period of the study. They were re-organized in 1965, which affected the 1967 and 1971 election cycles and then again in 1976, which boundaries remained in effect for the rest of the period. The changes in the composition of a district in terms of the PCs it encompasses are not major with the core of each district remaining the same over time. The reason that political and administrative boundaries don't match is of course the difference in the sizes of the districts. PC boundaries are drawn up to minimize variation in the number of electors across PCs, hence bigger districts incorporate more PCs. If the growth rates of population were the same across districts then there would be no need

the highest and the second highest vote shares in a constituency. Plurality thus measures the closeness of political competition. Higher the value of plurality, less close is the political race. Besley et al. (2010) use $-|voteshare_d - 0.5|$ as their measure of political competition, where $voteshare_d$ is the vote share of the winning party. In a two party system like the US this is exactly half of plurality. The results are not reported in the main body of the text for clarity of presentation. They are discussed as footnotes in the relevant section.

²⁹As discussed above these are labels and do not the represent the vote share of the same party over time.

for political re-districting. If the initial PC map³⁰ is optimal (in that it minimizes variance in population across PCs) then the same growth rate in population would imply that the same map is still the optimum. A need for redistricting implies differential growth rates across districts. All the results presented later in the chapter are robust to including population density as a measure of population change.

A bigger problem is manipulation of PC boundaries to favor particular parties. Defining boundaries of political constituencies in India is the responsibility of a Delimitation Commission, an autonomous body expressly setup for this purpose³¹. Previous studies have found no evidence of gerrymandering in India (Verma (2006)). They find that the commission achieves its aim of equalizing populations across constituencies and that there is no advantage to the incumbent party.

2.4 Empirical estimation and results

2.4.1 Framework

I am interested in estimating the effect of spread of HYV seeds on politics. The adoption of the new agricultural technology is non-random and very likely depends on unobservable district and time characteristics, that are not orthogonal to political outcomes. The panel nature of the data allows me to use a fixed effects framework to account for the non time variant district and time characteristics. Thus the following equation is my benchmark regression; under the assumption of absence of time varying omitted variables and $cov(yield_{it}, \epsilon_{it}) = 0$ the following estimates the coefficient of interest β consistently.

$$Y_{it} = \alpha_t + \beta.yield_{it} + \gamma.X_{it} + \theta_i + \epsilon_{it} \quad (2.1)$$

where t is the election year and i indexes districts. Y_{it} is the political outcome variable (vote share, seat share or political competition), $yield_{it}$ is the wheat yield in that particular district in that election year. In this equation the effect of HYV expansion on politics is constrained to be the same across all periods. X_{it} are additional control variables that vary with time

³⁰A map here is the composition of a district in terms of PCs.

³¹The commission consists of members of the judiciary, and ex members of the Election Commission which are appointed by the Central government. However to limit the power of the Central government it also has associate members who are drawn from the different state legislatures.

2.4. Empirical estimation and results

across districts. The district fixed effects, θ_i , account for differences in district characteristics such as culture and geography. I allow the intercept to vary with time to account for state or nation wide political events (like the ‘emergency’ implemented by Mrs. Gandhi or her assassination in 1984 as discussed previously).

I also estimate eqn. 2.1 with an alternative explanatory variable, the proportion of area in a district that is planted under HYV seeds. This is a better measure of marginal productivity than average yield in a district. Using the two independent variables increases confidence in the results.

The baseline regressions provide useful benchmarks, but a strong assumption is needed to consistently estimate β in eqn. 2.1, namely $cov(yield_{it}, \epsilon_{it} | X_{it}, \theta_i) = 0$. It is plausible that the omitted variable varies with time for each district (and is not captured in X_{it}). In this case the estimating equation can be rewritten as

$$\begin{aligned} Y_{it} &= \alpha_t + \beta \cdot yield_{it} + \gamma \cdot X_{it} + \eta_i + \phi_{it} \\ \phi_{it} &= \theta_{it} + \epsilon_{it} \end{aligned} \tag{2.2}$$

where θ_{it} is not orthogonal to $yield_{it}$. If 2.2 is estimated with district fixed effects the estimate of β will be inconsistent, as clearly, because of the term θ_{it} , $cov(yield_{it}, \phi_{it}) \neq 0$. This could happen because of two possible reasons

1. The unobservable district characteristics that effect both the HYV technology and politics evolve over time, rather than being constant. Consider for example, institutions of collective action or social organization; differences in these across districts could effect both how new technology is adopted and how successful it is and could also effect politics. These institutions however could also evolve differently for different districts and hence have the form θ_{it} .
2. Another concern with the basic regression is that of reverse causality. The incumbent has incentive to manipulate (through policy) the spread of the new technology so as to favor herself. This would bias the point estimates in the basic regression. Given that I am assuming that the technology was made available in an efficient way, any manipulation would result in lower adoption rates and less changes in politics, thus biasing the point estimates downwards.

To address these issues I instrument for $yield_{it}$ with $X_{i0} \cdot f(t)$, where X_{i0} is the proportion of land in district i that was irrigated in 1931 and $f(t)$ is a step function that is 0 pre-HYV introduction (i.e for election year 1962)

and 1 post-HYV introduction. I discuss the validity of the instrument in some detail in later sections, but it would be useful to summarize the main reasons here. Irrigation status of a district in 1931 is correlated to the contemporary level of irrigation in the district. HYV seeds are much more sensitive to irrigation and timely supply of water than traditional seeds and hence proportion of land irrigated in 1931 is correlated to the success of the new technology. The fact that the political environment in pre independence India in 1931 was completely different from the post independence one in 1962-89 means that it is unlikely that contemporary politics affected the irrigation in 1931. The identifying assumption thus is that irrigation in 1931 only affect contemporary politics through its effect on agricultural yields.

2.4.2 Basic results

The results from estimating eqn. 2.1 are presented in table 2.2. Cols (1)-(4) report results on party outcomes for the BLD and the Congress, cols (5)-(7) report results using fractionalization, party dominance and plurality as dependent variables and col (8) for voter turnout. Panel A does not include any demographic controls, while panel B includes population density, literacy rate, density of road network and density of telephone connection in district as controls.

Growth in human capital has previously been identified as a channel through which economic development might affect politics, but the results here are robust to controlling for that. Also it does not seem to be the case that spread in communication technology is driving the results.

The point estimate for BLD vote share and seat share is positive and significant. An increase in yield over time implies an increase in the BLD vote share and its probability of winning seats. The point estimates suggest that a one standard deviation change in yield results in a 0.14 standard deviation change in the BLD vote share. The congress vote share on the other hand is unrelated to the increase in wheat yields. The seat share of the Congress party falls, however the point estimates are not statistically significant in some specifications³². Point estimates show that fractionalization falls and party dominance increases (as $1 - \max(\text{vote share}_{ij})$ falls) with increase in yield. The spread of HYV over time in a district as measured by wheat yield results in a consolidation of the opposition to the Congress party and a fall in political fractionalization. The main opposition party to emerge is the BLD. The last column reports estimates with voter turnout

³²They are significant in the IV estimates presented later.

as the dependent variable. These point estimates are indistinguishable from zero. Thus the increase in the vote share of the BLD does indeed come from a consolidation of a fractured opposition rather than an increase in voter participation in favor of the new rural party.

2.4.3 Subsample results and robustness checks

General specification

As a robustness check I estimate a more general specification where I allow the effect of HYVs to vary with time.

$$Y_{it} = \alpha_t + \beta \cdot yield_{it} + \sum_{dc} \beta_{dc} \cdot yield_{it} \cdot d_{dc} + \gamma \cdot X_{it} + \theta_i + \epsilon_{it} \quad (2.3)$$

This is similar to the eqn. 2.1, except the β coefficients are now allowed to vary with time, more specifically with decade, i.e d_{dc} are decadal dummies. d_{72-80} is 1 if $t = 1977, 1980$ and d_{81-89} is 1 if $t = 1984, 1989$. Thus the estimates for the first decade are just β while for the next two decades it is $\beta + \beta_{dc}$ where dc is the relevant decade. The results are presented in table 2.3.

Expectedly the results are being driven by the two later decades. The HYV seeds were only mass introduced in 1967 hence it is not very surprising that there is no effect in the first decade. The pattern of results also helps explain why some of the results are not statistically significant in the basic specification. The congress seat share falls significantly in the second decade but not in the other two, hence on an average it's negative but not significant. However, the overall pattern that emerges from the basic regression holds consistently over time. The results are not being driven by one election or time period.

Subsample results

The pace of technology adoption slowed down considerably after 1980 primarily because most of the districts already had large proportions of wheat growing area under HYV. Also the *Janata* coalition (of which BLD was one of the main constituents) formed the central government in 1977, and this changed the political environment in the country considerably. Hence I estimate the regression with only the first 5 elections. The results are presented in panel A of Table 2.4. The results display the same pattern as the full sample.

2.4. Empirical estimation and results

In a previous section I discussed the differences between western and eastern districts of UP in terms of economic development. The reasons for this can be traced to early introduction of canal irrigation by the British, and historically more secure land tenures for cultivators. These districts were also better able to take advantage of post independence land reforms (Jeffery and Lerche (2003)). When HYVs were introduced, these districts along with the other northern Indian states of Punjab and Haryana saw the largest increase in rural capital investment. Most previous studies, including Stokes (1978), Stone (1984) and Sharma and Poleman (1993) have commented on the difference between these districts and the rest of UP³³. These districts also were also the birth place of the BLD (Weiner (1983))³⁴. To ensure that my regression estimates are not just picking up the effect for these districts I run all the regressions on a reduced sample which excludes these districts³⁵. The results are presented in panel B of table 2.4. The estimates are very similar to those obtained with the full sample, and the same pattern emerges. Thus the results are not being driven by a handful of districts and the political change is obtained across the state³⁶.

Mrs. Gandhi, then Prime minister, declared a state of ‘emergency’ in India in 1975. The 1977 general elections were the first to be held after the lifting of the ‘emergency’ and there was a huge backlash against the Congress. The 1984 elections were held after Mrs. Gandhi was assassinated that year. To make sure I am not picking up just the effect of these extraordinary political events, I estimate the regression with the full sample of districts but I drop the election years 1977 and 1984. The results reported in panel C of table 2.4 are again very similar to the other sets of results.

Alternative explanatory variable

Table 2.5 reports estimates when eqn. 2.1 is estimated with Proportion HYV as an explanatory variable instead of yield. The estimates are qualitatively

³³Neither is this knowledge of the relative prosperity new, it has been commented upon by British officials since the 19th century see Stone (1984)

³⁴The party had its roots in the *jats* an agricultural caste in the western region. *Charan Singh* the leader of the BLD was based in and contested elections from *Baghpat* parliamentary constituency in *Meerut*.

³⁵The districts included in North West UP and excluded from the sample are *Meerut*, *Moradabad*, *Bulandshahr*, *Bijnor*, *Muzaffarnagar*, *Saharanpur* and *Rampur*.

³⁶As fig 2.4 shows the hill districts and Bundelkhand seem to significantly fall behind the other parts of the state in HYV adoption. To see if the regressions are picking up the differences between these two regions and the rest of the state I run the above specifications without these regions. The results (not reported) are very similar to the results for the whole state.

the same as the ones obtained with yield as the regressor. The same pattern emerges. An increase in proportion of wheat area under HYV leads to the strengthening of the BLD but it does not effect the Congress vote share. This increase in BLD vote share results from a fall in fractionalization and consolidation of the opposition.

Alternative mechanisms

Another possible reason for the observed effect could be demographic changes resulting from migration. The new agricultural technology widened the gulf between the already rich and poor districts and demand for agricultural labour and increased non farm employment may have caused migration within the state; and the resulting demographic changes may have resulted in a change in the composition of the electorate. This mechanism however is not very plausible for migration rates in India are very low, most of it being women moving for the purpose of marriage. Also all the regression results that I presented before included population density as a control and the results were very robust to the inclusion of that variable.

2.4.4 Identification

Concerns about reverse causality

The differences in the spread of the technology have been widely studied in the literature. These studies have pointed to economic and institutional factors as giving rise to differences in adoption. Following the discussion in the preceding sections it is not very surprising that size of land holdings and lack of irrigation facilities have been mentioned as the main reasons for the variations in productivity across UP (Sharma and Coutinho (1989); Sharma and Poleman (1993)). Studies have also discussed human capital differences as one possible cause for differences in productivity from the green revolution (Nair (1979)). However none of this literature or the literature on politics in India during that time (discussed above) mentions political intervention or manipulation as a possible cause for some regions lagging behind. In fact political intervention was made to reduce some of these differences (Sharma and Poleman (1993)).

I try to address the question of reverse causality in two ways. First, I look at whether the introduction of the technology is politically manipulated or whether the adoption is explained by initial productivity. There is not much variation in the timing of the initial introduction of HYV seeds, most districts have some non-zero area under HYV wheat in 1966 (very small

land areas, mostly experimental farms) and by 1967 all districts have a non zero area under HYV. So I use the initial proportion of wheat growing area under HYV (so Prop. HYV in 1966) as a dependent variable. As explanatory variables I use the average yield pre 1965 in the district and political variables (plurality, share of dominant party and whether Congress won the seat or not in 1962). The results (not reported) are very stark, the coefficient on initial productivity is positive and significant, while the point estimates on the political variables are close to zero and statistically insignificant. Thus the adoption is explained, as expected, by initial productivity in the district.

IV estimates

I use $X_{i0}.f(t)$, where X_{i0} is the proportion of land in district i that was irrigated in 1931 and $f(t)$ is a function that is 0 pre HYV introduction and 1 post HYV introduction, to instrument for $yield_{it}$ (and $proportionHYV_{it}$ in some specifications). An ideal instrument in this case would be a variable that only affects HYV technology and not traditional technology and of course does not affect politics directly. This ensures that the variable could not have contributed to differential institutional and economic development of different districts and hence satisfies the exclusion restriction; it only affects politics through agricultural yields. In the next paragraphs I argue for why the above is a good candidate.

As discussed in a previous section the contemporary differences in irrigation across different districts of UP are historical in nature. The western region of UP received a large amount of public investment in irrigation in the nineteenth century while the eastern region received hardly any at all. The eastern Yamuna, the Upper and Lower Ganga, and the Agra canal, all in western UP, were built between 1830 and 1880 while the first canal serving the central and eastern districts, the Sarda canal was completed in 1926. The difference in the spread of irrigation arose because of both natural and institutional reasons. The eastern region is more prone to water logging and flooding with almost annual floods that effect large tracts of the region. Proper irrigation requires a complex system of drainage, and the major rivers this far downstream are difficult to harness. This however does not mean that these difficulties could not have been overcome earlier than they were. A proposal to build a canal serving the central and eastern regions was first mooted in the 1870's when it was opposed by the *taluqdars*³⁷ of *Oudh* (Central UP) who wanted to maintain status quo. They only relented when the droughts and famines of the late 19th century threatened

³⁷ *Taluqdar* is a large landowner.

2.4. Empirical estimation and results

to result in large scale agrarian unrest (Sharma and Poleman (1993); Whitcombe (1972)). These historical differences in canal irrigation have been used to explain contemporary economic differences between districts.

This suggests that historical irrigation status may not be a good instrument as it may affect politics through more than just contemporary agricultural yields. Fig 2.6 plots the average wheat yield (in tons/ha) over time for different quintiles of the distribution of 1931 irrigation. The effect of irrigation on yields is small pre-HYV and real differences only start showing after the introduction of the HYV seeds. To see how significant (in magnitude and statistically) these differences are I run a simple regression of the form

$$Yield_{it} = \alpha_t + \beta_{1957-1966} \cdot p_irrigation1931 + \beta_{1967-1986} \cdot (p_irrigation1931 \times \mathbb{I}(year > 1967)) + \gamma \cdot X_{it} + \epsilon_{it} \quad (2.4)$$

Here $Yield_{it}$ is the wheat yield in district i in year t , α_t are time dummies, $p_irrigation1931$ is the proportion of district i irrigated in 1931, $\mathbb{I}(year > 1967)$ is an indicator function which is 1 if the year is 1967 or greater (i.e post HYV) and X_{it} are additional controls. Thus the impact of irrigation in 1931 on contemporary yields is given by $\beta_{1957-1966}$ pre HYV and $\beta_{1957-1966} + \beta_{1967-1986}$ post HYV. The results are shown in Table 2.7. It is clear that the impact of irrigation is much higher after the introduction of HYV seeds. In fact in the full specification with controls the impact of irrigation pre HYV is statistically indistinguishable from 0, while the impact post HYV is positive and very significant.

HYV seeds are very sensitive to the timing of application of water and hence availability of irrigation greatly affects the yield from HYV technology. The path dependence in irrigation in a district implies that irrigation in 1931 is correlated to contemporary irrigation in the district and hence its effect on yields. What is more puzzling is the fact that irrigation seems to have very little or no effect on traditional yields. This could be an outcome of the fact that HYV seeds are more sensitive to irrigation than traditional seeds (Sharma and Coutinho (1989)). Canal construction in the 1920's allowed the central and eastern districts to catch up with the western region in terms of irrigated area. Thus it closed down the gap in terms of irrigated area but over the next 30-35 years it did not significantly affect yields. Hence irrigation in 1931 is un-correlated with productivity from traditional technology but the sensitivity of the HYV seeds to irrigation means it is strongly correlated with HYV yields. This result increases confidence that the instrument does indeed only effect politics through contemporary yields.

Table 2.7 presents the IV estimates for different specifications. Each entry in Panel B is the point estimate on $yield_{it}$ from the second stage of an IV estimation of eqn. 2.1 with $p_irrigation1931.f(t)$ as the instrument. The first stages for the various specifications are reported in Panel A. Col (1) reports the OLS estimates, while cols (2)-(5) are second stage IV results. The rows are the point estimates for different dependent variables.

The pattern of results that emerged from the basic fixed effects regression also holds for the IV estimates. An increase in wheat yield implies an increase in the vote share and seat share of the BLD. The vote share of the Congress party is not related to the yield while its seat share falls with an increase in yield in a district. Thus the result from the OLS estimation is robust to instrumenting for yield. An increase in yield in a district leads to rise in the BLD vote share through a consolidation of the opposition to the Congress and fall in fractionalization.

The IV estimates are bigger than the OLS estimates and the Hausmann test can't reject the null that the OLS and IV estimates are different for most specifications. So the OLS estimates could be biased downwards because of reverse causality. However it is more likely that the OLS estimates suffer from an attenuation bias. Agricultural yield is a series that shows a lot of volatility around the trend and average yield for a district is likely measured with error. A fixed effects regression may exacerbate any measurement error in levels and hence bias the OLS estimates downwards.

2.4.5 Interpretation of the results

The previous section presented results on the the impact of the spread of the green revolution on changes in the political environment. To summarize, the spread of HYV technology within districts is associated with an increase in the vote share of the BLD and the emergence of a consolidated opposition to the dominant Congress party. This section proposes an interpretation of these results.

The adoption of new technology changed the nature of Indian agriculture by increasing the level of commercialization in agriculture.

- Due to increase in farm yield, cultivators previously engaged in subsistence farming started selling their farm output on the market. This made the returns from agriculture more dependent on farm output prices than they previously were. As mentioned in a previous section an Agricultural prices commission (APC) had been set up in 1965 to decide the procurement price for grains that the government procures for the Public distribution system (PDS). Since the government

promises to buy any quantity of grain at this price it essentially sets a price floor. Higher procurement prices for agricultural output was one of the key demands of the BLD.

- The new production technology also relied more heavily on market obtained inputs. It was more sensitive to the timing of application of water and hence irrigation became more important with the new technology. Application of fertilizers and other chemical inputs was also more important for the new technology than for traditional technology. Finally, the new technology was also more responsive to the application of capital inputs, hence availability of cheap credit assumed greater importance with the new technology. Another key demand of the BLD was lower input prices through increased subsidies on agricultural inputs including cheap credit.

Politically the impact of the above change was the alignment of policy preferences of previously disparate group of rural voters. Groups of voters that were divided over different dimensions of class and ethnicity, and who were therefore represented by several smaller parties, were unified by a single policy demand and behind a single political party: the BLD.

I do not have data on market participation at the individual or aggregate level, however I use a novel empirical strategy to provide indirect evidence for the above claim. This strategy relies on exploiting differences across districts that are time invariant but which should matter for collective action.

Take caste fragmentation, for example, $cfrag_i$ in district i which is, defined as

$$cfrag_i = 1 - \sum_j caste_{ij}^2$$

where $caste_{ij}$ is the proportion of members of caste j in the total population of district i ³⁸. Now consider the following thought experiment, take two districts with different levels of caste fragmentation but similar levels of HYV adoption. Then if technology adoption effects political change through aligning policy preferences then the effect of HYV adoption should be lower in the more fragmented district as it will be more difficult to bring different voter groups together in a more fragmented society. I formalize this idea with a regression of the following kind

$$Y_{it} = \alpha_t + \beta.yield_{it} + \gamma.cfrag_i X yield_{it} + \theta_i + \eta_{it} \quad (2.5)$$

³⁸These data are taken from the 1931 census of India.

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Here i indexes districts and t election year, Y_{it} is the vote and seat share of the Janata party, and $yield_{it}$ is the wheat yield in district i at time t . Following the above logic, once I control for $yield_{it}$ the coefficient on the interaction term should be negative, i.e, $\gamma < 0$.

As previously discussed in the chapter, HYV technology was scale neutral (Sharma and Poleman (1993); Sharma and Coutinho (1989)). However for cultivators with very small landholdings of less than 1 Ha the increase in yield was not enough to allow them to engage in commercial agriculture. Also larger landholdings allow cultivators to adopt more capital intensive farming practices. Hence the class of cultivators that most benefited from HYV technology were medium farmers (2-6 Ha) (Varshney (1998)). We can now repeat the same exercise as above but this time using within district inequality. Again consider two districts with different gini coefficients (my measure of inequality) but similar levels of technology adoption. This time the effect of HYV adoption on political change should be higher in the more **unequal** district as this district has bigger farmers who are better set to take advantage of HYV and more likely to be united by a common policy preferences. The following regression formalizes the idea

$$Y_{it} = \alpha_t + \beta.yield_{it} + \gamma.gini_i X yield_{it} + \theta_i + \eta_{it} \quad (2.6)$$

where $gini_i$ is the gini coefficient of landed HHs in district i . The prediction is that $\gamma > 0$.

The results are presented in Tables 2.10 and 2.11. In Table 2.10 col (2) shows the results of estimating eqn. 2.5 with BLD vote share and col (4) with BLD seat share. Panel A uses prop. HYV as the explanatory variable and Panel B uses yield. Cols (1) and (3) present results from the simple fixed effects regression for comparison. As predicted the coefficient on the caste interaction is negative. The coefficient on the level (i.e Prop. HYV in Panel A or yield in Panel B) is the effect of HYV adoption on BLD vote share for a (hypothetical) district with a caste fragmentation of zero, i.e where everyone belongs to the same caste. As the point estimate shows this effect is really large, a 1 p.p change in proportion of land planted under HYV in a district results in a 3.62 p.p change in BLD vote share. However in the data $cfrag$ varies between 0.84 and 0.96, hence the effect in the least fragmented district is 1.14 times the effect in the most fragmented district.

Table 2.11 presents similar results for eqn 2.6. As predicted the point estimate on the interaction of gini coefficient and prop. HYV (in Panel A and gini and yield in Panel B) is positive. In this case the point estimate on the level is the effect of HYV adoption on BLD vote share in a (hypothetical)

district with an equal land distribution ($\text{gini}=0$). This estimate is positive in all specifications. As the land distribution becomes more unequal ($\text{gini}>0$) the effect increases. This is in line with the discussion presented above.

2.4.6 Public good provision

This section provides some evidence on the policy changes resulting from the broad political changes documented in the previous sections of the chapter. The macro changes in policy making resulting from the rise of the BLD have been discussed briefly elsewhere in the chapter. Starting from the early 1970's Indian development policy became increasingly pro agriculture in nature. The structure of the Agricultural Prices commission was changed by including more agriculturalists (politicians with agricultural background) on the board and over time the procurement prices became increasingly producer friendly. Table 2.11 shows the background of legislators in the Indian parliament from 1952 - 89. The entries in the table are the proportion of legislators belonging to that particular occupational category. As the first row shows the proportion of politicians with a rural background has increased significantly over time.

However, whether these changes were in response to the increasing political clout of the farmers or independent developments is difficult to say. Therefore I look at changes in rural public good provision to see if the effect of increase in BLD vote share in a district was reflected in changes in public good provision in the district.

From the 1971 and 1991 census of India I have data on the proportion of villages in a district that are provided with a particular public good (for example the proportion of villages with a primary school or middle school etc.). I run estimations of the following kind

$$S_{it} = \alpha_t + \beta.V_{it} + \gamma.X_{it} + \theta_i + \eta_{it} \quad (2.7)$$

where S_{it} is proportion of villages with a school in district i at time t and V_{it} is BLD vote share. X_{it} includes control variables, chief among which are agricultural yield and average agricultural wage in a district.

With two cross sections this is essentially a difference in difference estimate, and thus has the same identification assumption. In the absence of the technological change and the resulting rise of BLD public good provision in all districts would have grown at the same rate.

In using the above estimation framework I am being purposefully agnostic about particular political economy models. It could be that districts with a higher change in vote share of BLD are more likely to have spent

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time under BLD incumbency and hence we expect to find more changes in rural public good provision in those districts. However, a positive β in the above model is also consistent with a swing voter kind of model where the consolidation of rural voters makes these voters pivotal and hence the districts where the change in BLD vote share are larger see more transfer from the incumbent.

I focus on provision of schools because the literature has previously documented the increase in returns to schooling because of the green revolution (Foster and Rosenzweig (1996)). Also there is literature in economic sociology that has documented the aspirations of the newly prosperous medium peasantry for upward mobility by securing white collar (particularly public sector) jobs (Jeffery and Lerche (2003)). This made increase in the number of schools a key demand of the BLD.

Table 2.13 reports the estimates. Cols (1)-(3) report the results for primary, middle and high schools respectively. The ‘treatment’ here is of course the introduction of HYV seeds. This resulted in both yield increases and political changes. Thus all regressions control for yield and $\ln(\text{wage})$. As the point estimates show an increase in BLD vote share results in a higher proportion of villages having access to schools at all levels. A 10 p.p increase in the vote share of the BLD in a district results in a 1 p.p increase in the proportion of villages with primary and middle schools and 0.1 p.p increase in the proportion of villages with a high school. This is a fairly substantial effect given that on an average only about 0.7 percent of the villages in a district have a high school (see table 2.12).

2.5 Concluding comments

This chapter studied the effect of a widespread technological change, namely the introduction of HYV seeds in northern India in the mid 1960’s, on politics. It finds that the spread of the technology in a district resulted in the increase in the vote share and seat share of the BLD, a new political party with its base in rural North India. This was a result of the consolidation of the opposition to the Congress party, the dominant national party, and a fall in political fractionalization. Another key contribution of this chapter is to provide empirical evidence for the hypothesis that technology adoption brings about political change by aligning the policy preferences of rural voters.

Although the analysis here is restricted to an episode of political change in one region in India, I believe the results have a relevance beyond just

2.5. *Concluding comments*

explaining political developments in India. In a democracy diversity in preferences in a majority group can be detrimental to its interests when faced with a unified minority group (Bandiera and Levy (2010)). As the results of this chapter show an innovation that aligns these preferences can indeed result in substantial political changes and make governments more responsive to the interests of the majority. This locates the present research in a larger political economy literature that seeks to understand low political representation of large sections of society in developing countries (see for example Besley et al. (2005); Chattopadhyay and Duflo (2004); Clots-Figueras (2010); Duflo (2005); Olken (2010); Pande (2003)).

2.5. Concluding comments

Table 2.1: Summary statistics

Variable	1962	1967	1971	1977	1981
<i>Panel A: Economic and Demographic variables</i>					
Prop. wheat area under HYV	0 (0)	.17 (.1)	0.45 (.2)	.82 (.18)	.78 (.2)
Wheat yield (tons/Ha)	0.8 (0.17)	1.11 (.25)	1.23 (.32)	1.4 (.31)	1.6 (.35)
Prop. rice area under HYV	0 (0)	.01 (.02)	.08 (.13)	.15 (.25)	.15 (.25)
Prop. rice area under HYV (Conditional)	0 (0)	.03 (.01)	.26 (.09)	.49 (.19)	.52 (.14)
Rice Yield (tons/Ha)	0.73 (.11)	0.75 (.2)	0.84 (.23)	1.14 (.43)	1.07 (.4)
Daily agricultural wages (Nominal wages in Rs.)	1.34 (0.44)	2.42 (.57)	3.17 (.91)	6.12 (1.9)	6.39 (1.98)
Literacy rates	0.24 (0.05)	.26 (.06)	.28 (.06)	.32 (.07)	.35 (.07)
Pop. density (’00/sq. Km)	2.76 (0.99)	3.21 (1.12)	3.57 (1.23)	4.12 (1.4)	4.39 (1.51)
<i>Panel B: Initial conditions (pre Green revolution)</i>					
Average yield _{1957–1964}	.85 (.15)				
Prop. of district irrigated in 1931	.22 (.12)				
Gini coefficient	.47 (.07)				
caste fragmentation	.91 (.03)				
<i>Panel C: Political variables</i>					
Fractionalization	0.71 (.74)	0.73 (1.06)	0.62 (.57)	0.47 (.23)	0.70 (.35)
Plurality	.12 (.07)	0.1 (.6)	.26 (.13)	.42 (.1)	.13 (.08)
1 - max(<i>voteshare_i</i>)	0.59 (.07)	0.61 (.08)	.46 (.09)	.32 (.06)	.59 (.05)
Voter turnout	0.51 (.06)	.55 (.06)	.47 (.07)	.57 (.06)	.5 (.06)
Congress vote share	0.38 (.07)	.34 (.08)	.49 (.15)	.25 (.05)	.37 (.08)
BLD vote share	0.05 (.09)	.05 (.09)	.11 (.09)	.68 (.06)	.28 (.1)

Notes: Standard errors are reported in parentheses. Fractionalization is the measure of political fractionalization. Gini coefficient is calculated for landed households. Caste fragmentation is calculated using Hindu caste groups from the 1931 census of India.

Table 2.2: Basic regression

	BLD vote share	BLD seat share	Congress vote share	Congress seat share	Fractionalization	1-max vote share _{ij}	Plurality	Voter turnout
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: Without control variables</i>								
Yield	.06 (.03)*	.12 (.06)**	.02 (.02)	-.07 (.07)	-.05 (.02)**	-.05 (.02)**	.03 (.02)*	.006 (.01)
<i>Fixed effects</i>	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	336	336	336	336	336	336	336	336
R-squared	.85	.75	.64	.62	.68	.71	.63	.51
<i>Panel B: With demographic controls</i>								
Yield	.05 (.02)**	.12 (.06)**	.03 (.02)	-.07 (.07)	-.05 (.02)**	-.06 (.02)**	.04 (.02)*	.01 (.01)
<i>Controls</i>	Y	Y	Y	Y	Y	Y	Y	Y
<i>Fixed effects</i>	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	336	336	336	336	336	336	336	336
R-squared	.85	.76	.64	.64	.69	.72	.63	.55

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. *, **, *** denote significance at 10%, 5%, and 1% levels respectively. All specifications include district and time fixed effects. The data include 7 election years between and including 1962 to 1989, for 48 districts in UP. Panel A reports estimates for the basic regression without any demographic controls. Panel B includes population density, literacy rate in the district, density of road network and density of telephones in the district as controls. *Yield* is the wheat yield in the district in tons/ha. *BLD* is the *Bhartiya Lok Dal* a new peasant political party, while *Congress* is the *Indian National Congress* the dominant party. Fractionalization is constructed as $1 - \sum_j \text{Voteshare}_{ij}^2$, here i indexes district and j the politician or party.

Table 2.3: General specification

	BLD vote share	BLD seat share	Congress vote share	Congress seat share	Fractionalization	1-max vote share _{ij}	Plurality	Voter turnout
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Yield	-.02 (.03)	-.14 (.07)**	.01 (.04)	.07 (.12)	.003 (.03)	-.02 (.04)	.06 (.04)	.03 (.02)**
Yield _{1972–80}	.09 (.03)***	.41 (.07)***	-.02 (.05)	-.36 (.14)***	-.09 (.03)***	-.07 (.03)**	.02 (.04)	.003 (.02)
Yield _{1981–89}	.09 (.03)***	.29 (.06)***	.02 (.04)	-.11 (.12)	-.05 (.03)*	-.03 (.03)	-.05 (.04)	-.05 (.02)***
<i>Fixed effects</i>	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	336	336	336	336	336	336	336	336
R-squared	.85	.77	.64	.63	.69	.63	.72	.54

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. *, **, *** denote significance at 10%, 5%, and 1% levels respectively. All specifications include district and time fixed effects. The data include 7 election years between and including 1962 to 1989 for 48 districts in UP. $Yield_{1972-81}$ reports the estimates of $\beta_{1972-81}$ in eqn. 2.3 and so on. *BLD* is the *Bhartiya Lok Dal* a new political party representing peasants, while *Congress* is the dominant party. Fractionalization is constructed as $1 - \sum_j Voteshare_{ij}^2$, while plurality is the difference between the highest and second highest vote shares in a district.

Table 2.4: Subsample regression results

	BLD vote share	BLD seat share	Congress vote share	Congress seat share	Fractionalization	1-max vote share _{ij}	Plurality	Voter turnout
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: Full sample for 1962-1980</i>								
Yield	.12 (.04)***	.16 (.09)*	.02 (.03)	-.21 (.13) ⁺	-.07 (.03)***	-.08 (.03)***	.07 (.03)**	.009 (.02)
Yield	.10 (.03)***	.12 (.08) ⁺	.03 (.03)	-.16 (.12)	-.07 (.03)***	-.09 (.03)***	.08 (.03)***	.01 (.02)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	240	240	240	240	240	240	240	240
<i>Panel B: Excluding Western districts</i>								
Yield	.07 (.03)**	.14 (.06)**	.04 (.03)	-.09 (.09)	-.09 (.02)***	-.09 (.03)***	.06 (.03)**	.02 (.01)
Yield	.06 (.03)**	.14 (.06)**	.05 (.03)*	-.09 (.10)	-.09 (.02)***	-.10 (.02)***	.06 (.03)**	.02 (.01)*
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	287	287	287	287	287	287	287	287
<i>Panel C: Excluding election years 1977 and 1984</i>								
Yield	.13 (.05)***	.23 (.11)**	.04 (.03)*	-.14 (.12)	-.08 (.03)***	-.09 (.03)***	.06 (.03)**	-.008 (.02)
Yield	.12 (.04)***	.21 (.11)**	.05 (.03)**	-.13 (.11)	-.08 (.02)***	-.09 (.03)***	.07 (.03)**	.0009 (.02)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	240	240	240	240	240	240	240	240
<i>Panel D: Including district specific time trends</i>								
Yield	.07 (.04)*	-.13 (.06)**	-.005 (.05)	-.18 (.19)	-.04 (.04)	-.07 (.04)	.09 (.05)**	.003 (.03)
Obs.	240	240	240	240	240	240	240	240

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. *, **, *** denote significance at 10%, 5%, and 1% levels respectively. All specifications include district and time fixed effects. For Panel A the data include 5 election years between and including 1962 to 1980 for 48 districts in UP. For panel B the 7 western districts are excluded. The excluded districts are *Meerut, Moradabad, Bulandshahr, Bijnor, Muzaffarnagar, Saharanpur and Rampur*. For panel C the election years 1977 and 1984 are excluded. 1977 elections were held after the restoration of the parliament after the 'emergency', and the 1984 one after the assassination of Mrs. Gandhi. Controls include population density, literacy rate in a district, density of road network in district and density of telephone connections. *Yield* is the wheat yield in the district in tons/ha. *BLD* is the *Bhartiya Lok Dal* a new rural party, while *Congress* is the dominant party. Fractionalization is constructed as $1 - \sum_j \text{Voteshare}_{ij}^2$, here i indexes districts and j politician or party.

Table 2.5: Fixed effects regression with alternative explanatory variable

	BLD vote share	BLD seat share	Congress vote share	Congress seat share	Fractionalization	1-max vote share _{ij}	Plurality	Voter turnout
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Without demographic controls								
Prop. HYV	.15 (.07)**	.25 (.15) ⁺	.02 (.04)	-.14 (.16)	-.08 (.04)**	-.10 (.04)***	.11 (.04)***	-.01 (.03)
<i>Fixed effects</i>	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	336	336	336	336	336	336	336	336
R-squared	.85	.75	.64	.62	.68	.71	.63	.51
Panel B: With demographic controls								
Prop.HYV	.13 (.06)**	.19 (.15)	.04 (.04)	-.09 (.15)	-.08 (.04)**	-.10 (.04)***	.12 (.04)***	.01 (.03)
<i>Controls</i>	Y	Y	Y	Y	Y	Y	Y	Y
<i>Fixed effects</i>	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	336	336	336	336	336	336	336	336
R-squared	.85	.76	.64	.64	.69	.72	.63	.55

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. +, *, **, *** denote significance at 15%, 10%, 5%, and 1% levels respectively. All specifications include district and time fixed effects. The data include 7 election years between and including 1962 to 1989 for 48 districts in UP. Panel A reports estimates for the basic regression without any demographic controls. Panel B includes population density, literacy rate in a district, density of road networks, density of telephone connections in district as controls. *Prop. HYV* is the proportion of wheat area in a district that is sown with HYV seeds. *BLD* is the *Bhartiya Lok Dal* a new peasant party, while *Congress* is the dominant party. Fractionalization is constructed as $1 - \sum_j \text{Voteshare}_{ij}^2$.

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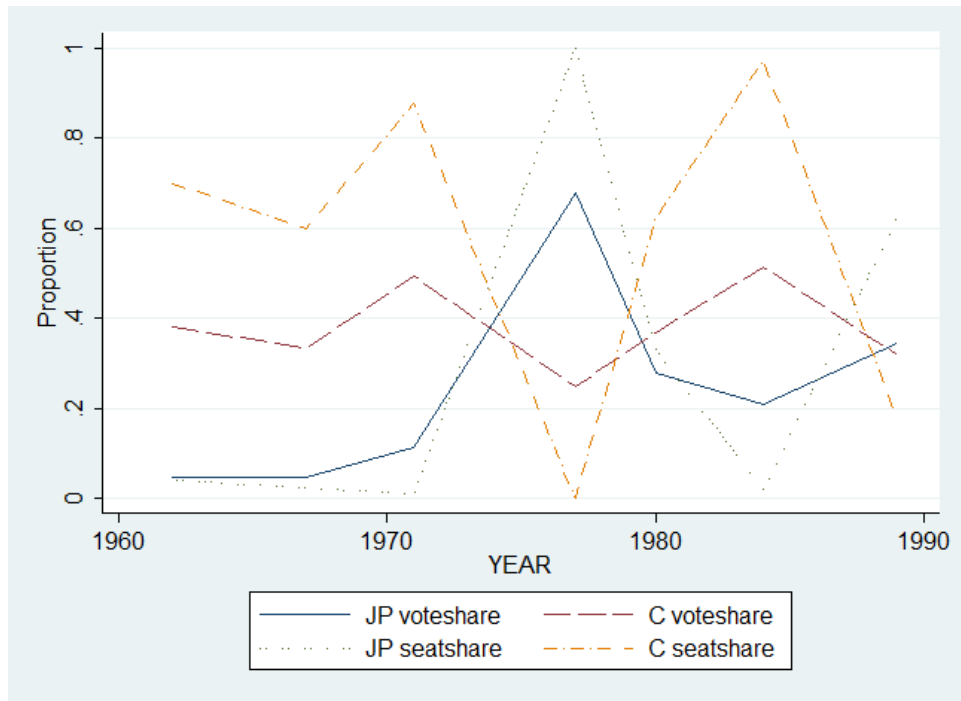


Figure 2.1: Time trends from UP Assembly Elections

Notes: The data for Bhartiya Lok Dal (BLD) include the sum of vote shares for parties representing the medium peasantry in each election. The data are taken from election commission reports.

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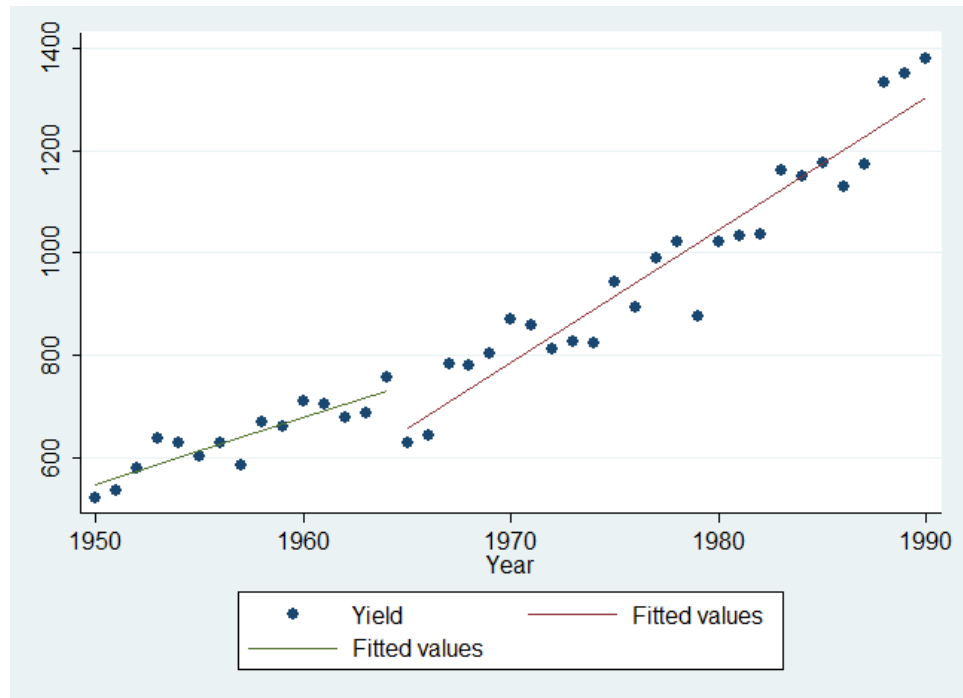


Figure 2.2: Agricultural yield in India, 1950-51 to 1990-91

Notes: I fit the time trends to the data from 1950-1965 and then 1965-1990. The trends are statistically different at the 5% level. *Source:* Data taken from Agricultural statistics at a glance(2003), Ministry of Agriculture India.

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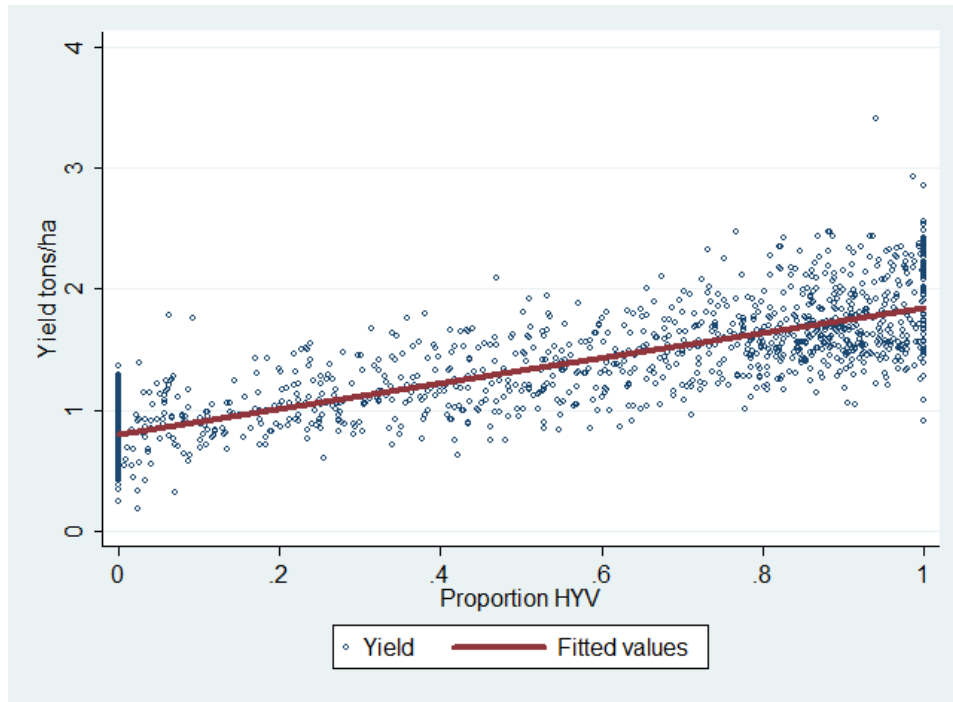


Figure 2.3: Agricultural yields in UP

Notes: The unit of observation is a district-year pair. The variable on the Y-axis is the yield of Wheat in tons/ha and the variable on the X-axis is the proportion of land planted under HYV wheat.

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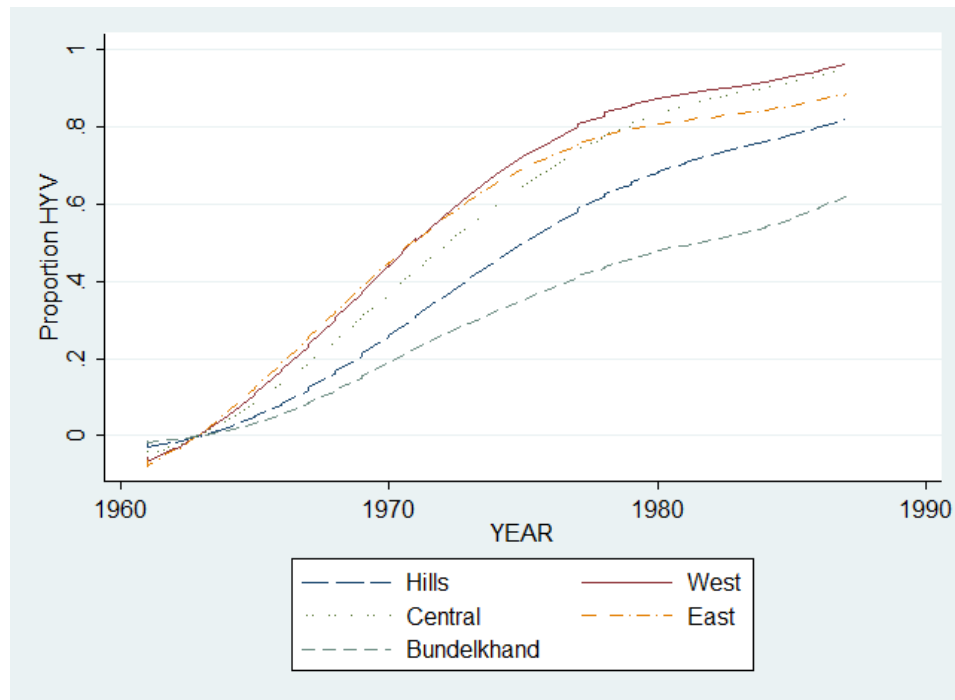


Figure 2.4: HYV adoption by region in UP

Notes: The dependent variable is proportion of land under HYV wheat.

The graphs have been smoothed using locally weighted scatter plot smoothing with a bandwidth=0.8

2.5. Concluding comments

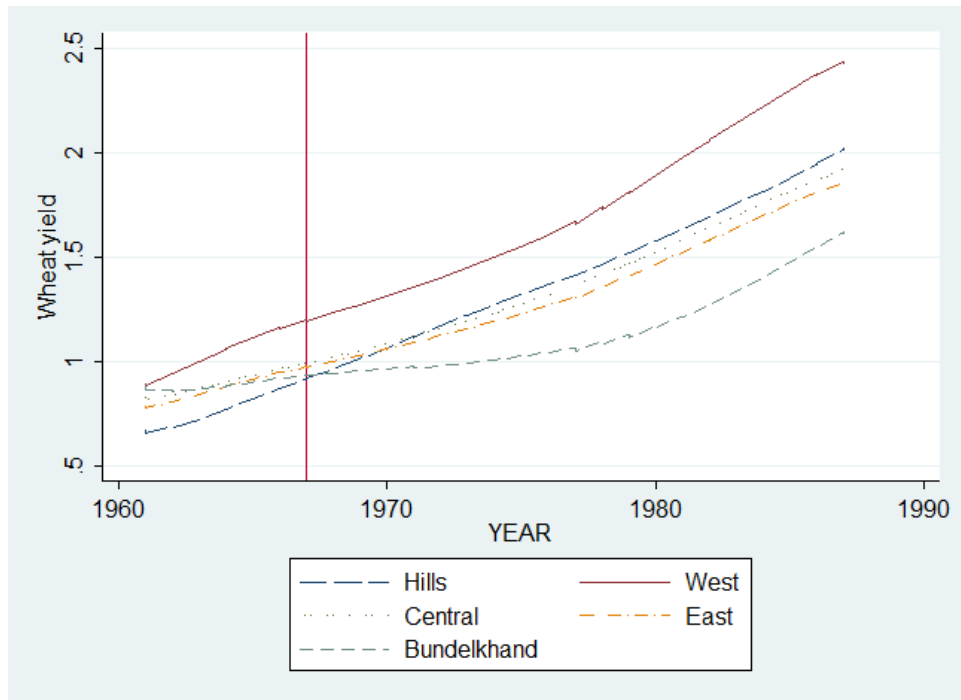


Figure 2.5: Yields of wheat by region in UP

Notes: The dependent variable is the yield of wheat in tons/ha . The graphs have been smoothed using locally weighted scatter plot smoothing with a bandwidth=0.8. The vertical line is drawn at 1967, the year the HYVs were mass introduced.

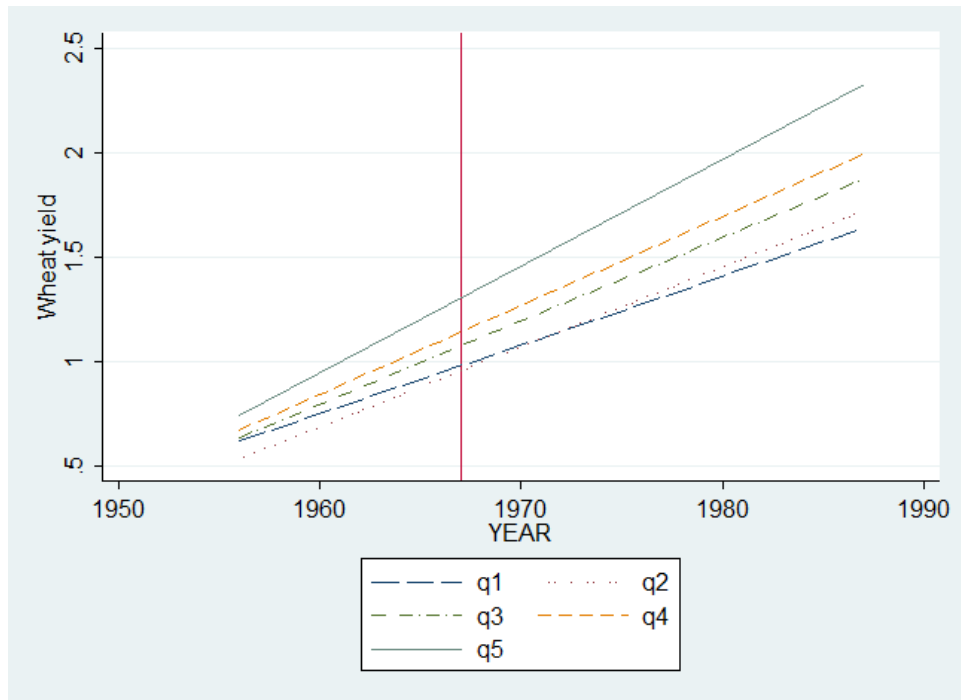


Figure 2.6: Yields of wheat by irrigation in 1931 quintiles

Notes: The dependent variable is the yield of wheat in tons/ha . The graphs have been smoothed using locally weighted scatter plot smoothing with a bandwidth=0.8. The vertical line is drawn at 1967, the year the HYVs were mass introduced.

2.5. Concluding comments

Table 2.6: Impact of irrigation in 1931 on yields

	Yield	Yield	Yield
	(1)	(2)	(3)
P_irrigation1931	1.37 (.20)***	.64 (.16)***	-.08 (.24)
P_irrigation1931 X $\mathbb{I}(year > 1967)$		1.01 (.19)***	.73 (.19)***
Controls	No	No	Yes
Obs.	1536	1536	1296
R-squared	.74	.75	.84

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. *, **, *** denote significance at 10%, 5%, and 1% levels respectively. Dependant variable is wheat yield in tons/Ha for each district for each year from 1956-1987. Controls include altitude, latitude, longitude, distance from sea, average monthly temperature and rainfall, population density and literacy.

2.5. Concluding comments

Table 2.7: Instrumental variable estimates (Instrumented variable $yield_{it}$)

	Full sample OLS	Full sample IV	Full sample IV 1962-80	IV excluding NW districts	IV excluding 1977,84
	(1)	(2)	(3)	(4)	(5)
Panel A: First stage					
Instrument		[.001]	[.001]	[0.000]	[.001]
F-statistics		35.44	25.10	40.61	32.98
Obs.	336	336	240	287	240
Panel B: Second stage					
BLD vote share	.06 (.03)*	.46 (.27)*	.34 (.18)*	.29 ¹ (.21)	.50 (.26)*
BLD seat share	.12 (.06)**	.99 (.66)*	1.12 (.51)**	.83 (.22)***	1.03 (.25)***
Congress Vote share	.02 (.02)	.10 (.10)	-.07 (.11)	.05 (.10)	.09 (.11)
Congress seat share	-.07 (.07)	-1.01 (.67) ⁺	-1.46 (.67)**	-.70 (.51)	-1.2 ² (.71)**
Fractionalization	-.05 (.02)**	-.26 (.14)*	-.22 (.10)**	-.20 (.10)*	-.28 (.13)**
1 - max(vote share)	-.05 (.02)**	-.27 (.15)*	-.22 (.10)**	-.17 (.11) ⁺	-.29 (.16)*

Notes: Each entry in the above table is the point estimate on $yield_{it}$ from a fixed effects regression with $yield_{it}$ as the explanatory variable. Both stages include district and time fixed effects. Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. +, *, **, *** denote significance at 15%, 10%, 5%, and 1% levels respectively. The data include 7 election years between and including 1962 to 1989 for 48 districts in UP. Panel A reports the first stage estimates. p-values on the instrument in the first stage are given in []. Panel B reports the second stage estimates. *BLD* is the *Bhartiya Lok Dal* a new peasant political party, while *Congress* is the dominant party. Fractionalization is constructed as $1 - \sum_j Voteshare_{ij}^2$ where i indexes district and j constituency.

Table 2.8: Falsification test

	OLS estimates				IV estimates	
	Vote share	Seat share	Vote share	seat share	vote share	seat share
	(1)	(2)	(3)	(4)	(5)	(6)
Yield	-.003 (.01)	.005 (.03)	.000 (.01)	.02 (.03)	-.09 (.09)	-.12 (.14)
Controls	No	No	Yes	Yes		
Obs.	336	336	336	336	336	336
R-squared	.07	.06	.09	.08	.47	.28

Notes: Standard errors in parentheses are robust and clustered at district level to adjust for serial correlation. *, **, *** denotes significance at 10%, 5% and 1% levels respectively. The dependent variable is communist party vote share and seat share. The first four cols present results from fixed effects OLS regressions while the last two columns present estimates from IV estimations.

2.5. Concluding comments

Table 2.9: Interaction with caste fragmentation

	BLD vote share	BLD vote share	BLD seat share	BLD seat share
	(1)	(2)	(3)	(4)
<i>Panel A</i>				
cfrag X		-3.55		-6.41
Prop. HYV		(1.54)**		(3.34)*
Prop. HYV	.43	3.62	.78	6.53
	(.17)**	(1.46)**	(.34)**	(3.11)**
Obs.	322	322	322	322
R ²	.85	.85	.75	.76
<i>Panel B</i>				
cfrag X		-1.58		-2.46
Yield		(.60)***		(1.42)*
Yield	.06	1.49	.12	2.35
	(.03)*	(.54)***	(.07)*	(1.28)*
Obs.	322	322	322	322
R ²	.85	.85	.75	.76

Notes: Standard errors reported in parentheses are robust and clustered at district level to account for serial correlation. *, **, *** denote significance at the 10%, 5% and 1% levels respectively. All the tables include district and time fixed effects. Data is missing for 2 districts hence the number of observations in 322. *cfrag* is the caste fragmentation in the district. Panel A presents results using prop. of land in the district under HYV as the explanatory variable while Panel B uses wheat yield in the district.

2.5. Concluding comments

Table 2.10: Interaction with Gini coefficient
BLD vote share BLD vote share BLD seat share BLD seat share
(1) (2) (3) (4)

<i>Panel A</i>				
gini X		1.46		2.45
Prop. HYV		(.63)**		(1.23)**
Prop. HYV	.43 (.17)**	-.21 (1.46)**	.78 (.34)**	-.30 (3.11)**
Obs.	322	322	322	322
R ²	.85	.85	.75	.76
<i>Panel B</i>				
gini X		.38		.70
Yield		(.22)*		(.46)
Yield	.06 (.03)*	-.12 (.11)	.12 (.07)*	-.22 (.22)
Obs.	322	322	322	322
R ²	.85	.85	.75	.75

Notes: Standard errors reported in parentheses are robust and clustered at district level to account for serial correlation. *, **, *** denote significance at the 10%, 5% and 1% levels respectively. All the tables include district and time fixed effects. Data is missing for 2 districts hence the number of observations in 322. *gini* is the gini coefficient of landholdings for landed HHs only. Panel A presents results using prop. of land in the district under HYV as the explanatory variable while Panel B uses wheat yield in the district.

Table 2.11: Occupational backgrounds of *Lok sabha* legislators

Occupation	1952	1957	1962	1967	1971	1977	1980	1984	1989
Agriculturalists	22.5	29.1	27.4	30.6	33.2	36	39.3	38.4	40.4
Social Workers	-	-	18.7	22.9	19	20	17.2	19	17
Lawyers	35.6	30.5	24.5	17.5	20.5	23.4	22.2	18	15.6
Traders/Industrialists	12	10.2	10.3	7.5	6.8	3.3	6.3	7.3	4.4
Educationists	9.9	11.3	5.8	6.5	7.1	8.4	6.7	7.6	8.7
Writers/Journalists	10.4	10.3	5.8	4.8	6.3	2.1	2.7	1.3	3.7
Doctors/Engineers	4.9	3.5	3.9	4.2	2.9	2.8	3	5.2	-
Civil & Military service	3.7	4	0.9	3.2	3.4	1.7	0.9	1.6	-
Ex-princes	1.1	1.4	2.1	1.4	0.4	0.6	0.2	1.1	-

Notes: *Source:* Varshney (1994). *Lok Sabha* is the lower house of the Indian Parliament. Each entry in the table is the proportion of legislators for that year who belong to the particular occupational category.

2.5. Concluding comments

Table 2.12: Summary statistics on public good provision

	1971		1991		Overall	
	Mean	Std.dev	Mean	Std. Dev	Mean	Std. Dev
Primary	0.45	0.14	0.65	0.15	0.55	0.17
Middle	0.06	0.03	0.14	0.05	0.01	0.06
High	0.004	0.003	0.009	0.007	0.007	0.006

Notes: The dependent variable is the proportion of villages in a district which have the public good.

Table 2.13: Change in provision of schools 1971-1991

	Primary school	Middle school	High school
BLD	.10	.11	.01
vote share	(.06)	(.03)***	(.004)**
Fractionalization	.28	.16	.009
	(.16)*	(.07)**	(.01)
Yield	.14	.07	.005
	(.05)***	(.02)***	(.002)**
Pop. density	.04	-.009	-.001
	(.03)	(.008)	(.001)
Obs.	88	88	88
R-squared	.86	.87	.72

Notes: Standard errors reported in parentheses are heteroskedasticity robust and clustered at district level. *, **, *** denote significance at 10%, 5%, and 1% levels respectively. All specifications include district fixed effects.

Chapter 3

The Role of Caste in Corruption: Evidence From IRDP Bribes

Introduction

Bureaucratic corruption and societal organization along caste lines are endemic features of Indian society. This chapter develops and tests the idea that these two features can interact to make the effects of corruption differ by caste groups, effectively exposing more deprived caste groups to the ill effects of corruption to a greater degree. To do so I use data on bribes paid to obtain loans under the Integrated Rural Development Program (IRDP).

Among the host of poverty alleviation schemes initiated by various Indian governments past and present subsidized credit schemes, under different names and guises, occupy a place of pride³⁹. This chapter considers the IRDP, the latest and largest in a string of such schemes (Pulley (1989); Swaminathan (1990)). This choice is dictated by the data. Real IRDP investment between 1992/93 - 1997/98 amounted to INR 115.5 billion. In 1997/98 alone INR 8.63 billion was spent on subsidies associated with the program. Between 1992/93 - 1997/98 the program covered 12.3 million rural households (HHs).

Credit is both important to and difficult to obtain for the poor in developing countries like India. Lacking any assets that can be put up as collateral they are excluded from formal credit markets and have to rely on informal credit where they are often exploited by moneylenders (Ghosh et al. (2001); Banerjee (2003)). The IRDP makes credit available for productive investment at lower than market interest rates and without any collateral⁴⁰,

³⁹Subsidized credit schemes have in fact been a staple in a lot of developing countries (see Buttari (1995); Besley (1994))

⁴⁰In 1997-98 the ceiling limit for collateral free loans was INR 50,000. 99% of my sample has a loan of less than 50,000.

the idea being that the investment will help them repay the loan and increase their permanent income (Pulley (1989); Dreze (1990)).

Various previous studies (Pulley (1989); Dreze et al. (1997); Dreze (1990)) have documented pervasive corruption in the implementation of the scheme. Bribes are commonly paid by the beneficiaries to the officials to obtain loans.

Apart from the obvious normative concerns one might have with this sort of corruption there is another, graver problem. The lower than market interest rate and a capital subsidy⁴¹ is so that the farmer(borrower) can keep more of the surplus generated from the investment than he would have been able to if he had borrowed from the informal credit market. Now, if the officials (who on paper do not have the discretion of setting the interest rate which is set by the government) have an additional instrument, in the form of a bribe, available to them they can expropriate some of this surplus. In fact it is not difficult to think of models in which, under fairly reasonable conditions, the effective interest rate for the ‘subsidized’ loan (actual interest rate corrected for the bribe) is equal to the interest rate in the informal market (Chaudhuri and Gupta (1996, 1997); Saha and Thampy (2006)).

How should we think about the bribe setting process? Given the personal nature of these interactions I argue that the correct way to think about this is as a bargaining process between the official and the borrower. When the official demands a bribe the borrower can pay up or approach a politician to intervene on his behalf. A successful intervention has the probability of lowering the bribe. But the cost of approaching the politician is a function of the size of the agent’s caste network. Since this strength is lower for lower castes in the traditional Indian setting they should be expected to pay higher bribes on average.

This is exactly what I observe in the data. I find that when I look at the beneficiaries who have an IRDP loan *and* who admitted to paying a bribe to obtain the loan, the Scheduled Caste(SC)⁴² pay a significantly higher bribe; about INR 600-700⁴³ more depending on the specification when the average bribe in the data is about INR 1700.

Then I exploit an exogenous source of change in the influence of the SC to figure the effect of this change on bribe paid. Comparing villages belonging to *Gram Panchayats* (GP) reserved for SC *pradhans*⁴⁴ to villages in

⁴¹The IRDP loan is a package: it consists of a cheap loan and a capital subsidy. I discuss this in more detail in a later section

⁴²In this data set I identify the lower castes as those belonging to the Scheduled Caste group

⁴³In 1997 exchange rates 1 USD=37 INR

⁴⁴*Pradhan* in the vernacular means head or chief; in this context the position refers to

unreserved GPs, I find that SC households residing in the former pay lower bribes. With the position of the *pradhan* comes more patronage and influence, thus increasing the bargaining power of (at least some) SC households, which results in more surplus for them and lower bribes for the officials.

The efficacy of this reservation policy and its effects on the welfare of SCs have been widely questioned, both in academia and the popular press. So how do I find this big a change?⁴⁵ I provide a novel explanation for this. Village *pradhans* and GPs do not operate in isolation, they interact with elected officials and bureaucrats at the block and district levels. If the only changes that occurred in the whole political setup were at the village level then we may despair of finding any discernible changes. A broader change however, with people more responsive to the needs of the SC at higher levels of government might however give enough patronage to the SC *pradhans* for us to find measurable differences.

Following this line of thought, I exploit the fact that at the time these reservations were introduced the Bahujan Samaj Party(BSP), a political party representing the interests of SC, was on the ascent in Uttar Pradesh(UP) the state from which the data comes. Using the vote share of BSP in a district as a measure of the political mobilization of SC in that district I find, that in *reserved* villages which lie in a district with higher vote share the average bribe amount paid by SC households is significantly lower than in a *reserved* village which lies in a district with lower BSP vote share.

The rest of the chapter is organized as follows: Section 1 discusses the data and the setting of the study, section 2 provides a discussion of the exogenous policy change and the political background, section 3 presents a simple theoretical model, section 4 provides the empirical results and discussion and section 5 concludes.

3.1 Data and setting

The data used in the chapter come from the two primary sources. The household data is taken from the Living Standards Measurement Survey(henceforth LSMS) carried out with the assistance of the World Bank in India in 1997-98, while the election data are from the Election Commission of India. The villages of this study are located in South and South-Eastern Uttar Pradesh

the village head person.

⁴⁵I should make it clear here that I am not claiming wide distributional benefits from this change. I can only claim that *on an average* SC households in reserved villages are paying lower bribes. This effect could be driven by a handful of households, those related to the *pradhan* for example.

(henceforth UP) and North and Central Bihar⁴⁶. UP and Bihar, together with Madhya Pradesh, and Rajasthan have often been referred to as India's "poverty belt"⁴⁷. UP and Bihar are characterized by unusually large populations with per-capita expenditure levels far below the poverty line. Eastern and Southern UP, from where the study villages were drawn, is generally poorer than the Western part of the state, and poverty levels have been rising in recent years⁴⁸. Bihar, which lies just east of UP, has the lowest per capita rural income in India, and is the most rural state in the country. Both these states have suffered from unrest, inter-caste conflict, and political violence in recent times. Overall poverty levels are even higher in Bihar than in Uttar Pradesh, and highest in the Northern region.

The focus of this study is the state of UP. The state has done very poorly in terms of social development and this is closely related to the entrenched class and caste structure in the state. The upper class and upper caste elite have been uncompromising in not easing their dominant political position and accommodating emerging peasant and lower caste movements (Hasan (1998)). Violent defense of caste, class and gender privilege is commonplace in the state, as are clear political fault lines along class and caste. State spending on public health and education is limited, and spending on the poorest social groups even more so. Instead, rent seeking by people in power, their followers and the bureaucrats they promote is the norm as conflicts between different elites have spilled over into the bureaucracy (Jeffery and Lerche (2003)). The result is an inefficient bureaucracy, where personal enrichment is more important than actual completion of tasks. This contributes significantly to the low performance of the state in sectors such as health and education (Dreze and Gazdar (1996)).

The field survey was administered in villages drawn at random from 12 districts in UP and 13 districts in Bihar. A total of 120 villages, with an overall sample size of 2250 households, were sampled; 57 villages in Bihar and 63 in UP. Although small, mostly household-based industries such as wood gathering, bidi making, rope making and liquor brewing exist, the economies in these areas are primarily dependent on agriculture. About 70% of the HHs listed agriculture as a major source of income. Majority of

⁴⁶In UP the data covers districts in Eastern UP and what is popularly called Bundelkhand

⁴⁷These states have been referred to as the *BIMARU* states (Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh) to designate the 'hungry belly' of 'sick India' (Bose (1988); Dubey (1992)). *Bimar* is a Hindi word meaning 'sick'.

⁴⁸see Jeffery and Lerche (2003) for a comprehensive coverage of current issues related to UP

these households derive their income from two or more activities.

The data from UP (which has 63 villages in the sample) has information on the caste and gender of the *pradhan* and also whether the *pradhan* belongs to a Scheduled caste. Of the 63 *pradhans*, 16 are from the Scheduled caste and 18 are women. In 3 villages the *pradhan* is a woman *and* belongs to the Scheduled caste. The data on Bihar do not contain information on these variables, so most of the analysis in the chapter is carried out for UP. Table 3.2 reports the caste composition of the sample (only for UP). The categorization of caste groups in to these seven categories follows that used in the data. The most numerous groups are the high caste, Backward agricultural castes, backward other castes and the scheduled castes. For clarity of presentation estimation results in the chapter do not report the results for the middle castes and the Muslim HHs, but all caste groups are included in the regressions⁴⁹. The reference group are always the high castes.

The Backward Agricultural Castes (BAC), comprising mostly of the sub-castes of *Yadavs* and *Ahirs*, cultivator caste groups, are a politically mobilized group. This was the caste group that was mobilized most actively by the green revolution and by the time of this study they were a caste as economically well off as the upper castes (see Anderson (2011) for example). This becomes more apparent in the results presented later in the chapter where the BAC do not perform significantly differently than the high castes on most parameters.

The analysis in the chapter use this data coupled with election results and vote shares of different political parties for various election years that were obtained from the Election Commission of India⁵⁰ post election reports.

3.1.1 Integrated rural development program (IRDP)

The IRDP program was started as a pilot program in selected districts in 1978 and from 2nd October, 1980 onwards it covered all blocks in the country. The stated objective of the program is to improve the asset holdings of the poor and to involve them in production and income generation processes. It does so by providing cheap credit through financial institutions and a capital subsidy by the government to HHs living below the official poverty line to finance productive investment in income generating assets. A peculiar feature of the IRDP is this component of capital subsidy, which is essentially a cash transfer to the loan beneficiary set at a proportion of the loan amount.

⁴⁹The results are available with the author

⁵⁰www.eci.nic.in

3.1. Data and setting

The loans are disbursed through a “lead” commercial bank selected for each district. The implementing agent at the grassroots level is the Block Development Officer (BDO), assisted by village level functionaries and other staff. Banks and block officials tend to limit the choice of investment to milch animals, bullock carts, pump sets, retails shops and other micro-enterprises. Moreover, most loans are not distributed in cash but in kind. There is a ceiling on the HH income and landholdings for a HH to be eligible for a loan. To achieve better targeting of loans at least 50% of the beneficiaries have to be SC/ST and 40% women, with the flow of financial assistance commensurate with these percentages.

Selection of beneficiaries is entrusted to block level staff who are instructed to survey HHs, prepare a list of qualified beneficiaries and submit the list to the GP for approval (Pulley (1989)). The final decision on the loans is made by the bank. Interest rates are fixed at 10% and repayment periods, minimum financing and type of investment are also predetermined by the National Bank for Agriculture and Rural Development (NABARD). NABARD provides an automatic refinance at 6.5% for all IRDP loans. At loan approval bank credit is matched by the government capital subsidy which varies from 25% to 50% depending on the socio-economic status of the HH⁵¹. As mentioned previously it is often the case that the highest subsidies go to the richest HHs, for example Pulley (1989) finds that in UP small farmers, the best off occupational group received an average subsidy of INR 1640 while casual landless labourers received only INR 1425.

Over dues and default in loans are substantial. Studies mention default rates of up to 68%. In fact “Banks perceived priority sector lending as the social cost of doing business and seldom exerted themselves for recovery”. The problem is compounded by populist politicians. Loan forgiveness is one of the most common policy promises regularly made by politicians around elections (Cole (2009)). There is rampant corruption in the implementation of the scheme. “Consideration money” (Pulley (1989)) is regularly paid by loan beneficiaries to bank officials to get them to consider their applications favourably.

In my data 10.14% of the HHs in the sample of 2250 households are IRDP loan beneficiaries. Out of these beneficiaries about 39% belong to the

⁵¹At the time of the study the pattern of subsidy was

- 25% for small farmers.
- 33.33 % for marginal farmers, agricultural labourers and rural artisans.
- 50% for SC/ST beneficiaries and physically handicapped persons.

3.1. Data and setting

Scheduled Castes(SC). The complete breakdown of these HHs by caste is given in table 3.1. The average IRDP loan amount is INR 9728.31, whereas the average bribe paid to obtain the loans is INR 1735.29. On an average the bribes as a percentage of the loan amount obtained are about 24%. The low repayment rates and the capital subsidy might help explain these fairly large bribe amounts. 185 out of 227 HHs who had obtained loans admitted to having paid a bribe.

Table 3.1: Caste breakdown of loan beneficiaries

	Number of HHs	Percent of all beneficiaries
High Caste	27	11.89
BAC	55	24.23
Backward Other	25	11.01
SC	88	38.77

3.1.2 Caveat

An important caveat to keep in mind while interpreting the results in this chapter is the self reported nature of the bribe data. The respondents were asked a series of questions concerning IRDP loans. In sequence they were the following: **(1)** Have you obtained and IRDP loan in the past 5 years? **(2)** How many years ago did you obtain this loan? **(3)** How much in total did you borrow? **(4)** Did you have to pay anyone in order to get the loan (e.g) a portion of the loan amount? **(5)** How much in total did you have to pay?

The response to the last question above is used as the primary dependent variable in this chapter. This question was asked midway through the survey and midway through a series of questions about the HHs credit activities. So by this time the interviewer and the respondent should have established a comfortable relationship. The interviewers were instructed to be sensitive while asking questions about financial details of the respondents- *“Most people are understandably reluctant to reveal details of their financial dealings. You must do your best to ensure that the respondent has confidence in you. Remind him/her that the information they give is confidential. Stress that accuracy of response is important. For your own part, probe carefully here. As much as possible, make sure you ask these questions in private.”*

The very nature of corruption implies that empirical studies have to often rely on self reported measures (see Banerjee et al. (2012) for a survey,

3.2. The 1994 amendment and the rise of the Bahujan Samaj Party

Svensson (2003) analyses data that contains bribe paid by firms in Uganda). Some previous studies concerning corruption in the Indian context have also used prices for services which should be free. Banerjee et al. (2004) for example use fees paid at government health centers (which should mostly be free) to see how bribes affect health care provision.

Even so reporting error is quite possible in response to this question. A classical measurement in the dependent variable error would simply inflate the standard error of the estimated coefficients. This would go against me finding any significant effect, but to the extent that I do find an effect a random reporting error is not a problem for this chapter.

3.2 The 1994 amendment and the rise of the *Bahujan Samaj Party*

3.2.1 The 1994 constitutional amendment concerning local government

Gram Panchayats (henceforth GP) are the lowest tier in the three-tiered organization of local self government in India⁵². GPs are popularly elected village councils consisting of a *Pradhan* “elected by persons registered in the electoral rolls for the territorial constituencies of the Panchayat area from among themselves,” and nine to fifteen members varying according to the population of the panchayat⁵³ (In the state of UP every village or a group of villages with a population of 1000 or more is constituted into a panchayat. Given the size of the state, UP is the most populous state in India with about 16% of the Indian population living in UP, there are upwards of 54,000 GPs in UP.)⁵⁴.

The passage of the 73rd and 74th constitutional amendments in 1994 provided urban and rural local governments with a constitutional status they previously lacked, and strengthened it by mandating regular elections to these bodies. Further, seats in these newly re-organized local governments were reserved for oppressed groups. According to Section 5(a) of the *UP Panchayat Raj Act 1947* (amended in 1994), seats in the Gram Panchayat at all levels are reserved for Scheduled Castes, Scheduled Tribes and Other Backward Classes in proportion to their respective population in the Panchayat area, subject to a ceiling of twenty seven percent of total seat for the

⁵²The three tiers being the districts, blocks and villages

⁵³Quoted from <http://gov.ua.nic.in/sfc/sfcenglish/ANNEXURE%204.2.htm>

⁵⁴(Dhar and Gupta, 2003, p.32)

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Other Backward Classes. Of the seats reserved for Scheduled Castes, Scheduled Tribes and Other Backward Classes, not less than one-third of the total number of seats are to be reserved for women belonging to these respective groups. Furthermore, in terms of section 5(c), not less than one-third of the total number of seats in the Gram Panchayat, including these reserved for women belonging to Scheduled Castes, Scheduled Tribes and Other Backward Classes, are reserved for women. All the reserved seats are allotted by rotation to different territorial constituencies in a Gram Panchayat. In addition to that there is a mandatory reservation of the position of Pradhan at all levels for SC, ST and Other Backward classes in proportion to their population in the state (see Chaudhari (2003)). The reservation for the post of the pradhan is not random but depends on the proportion of SCs in the GP. All the GPs in a block are ordered in the descending order of proportion of SCs. Then the GP with the highest SC proportion is reserved first and so on keeping in mind that GPs are not reserved for the same category in consecutive elections.

Table 3.4 summarizes the difference between the reserved and unreserved villages in the data. As would be expected the reserved villages have a higher proportion of scheduled castes but are very similar to the unreserved villages for all other variables. To account for the non-random nature of the reservations all the estimates control for the proportion of SC proportion in the village.

This reservation policy was an important piece of legislation in the decentralization of the process of development. The impact of this regulation was two fold. Firstly, it infused traditional form of self government with a new importance in the modern political structure. The regulation devolved functional responsibilities on GPs as well as regularizing the election process. The *panchayats* were made responsible for the implementation of development and social justice schemes at the village level. Responsibility of selection of beneficiaries for credit, housing and employment schemes, provision and location of public goods in the village were all given to the GP. This turned GPs and pradhans into important players in local politics. Secondly, by reserving seats for SC/ST it changed the existing power structure within villages. The fact that a SC or ST had to occupy the position of the *pradhan* gave these castes a bargaining chip against the established elites who were usually from the upper castes.

3.2.2 The rise of the *Bahujan Samaj Party* and the *Samajwadi Party*

The interaction between the local and provincial levels of government is the key to understanding the findings of this chapter. While there were changes taking place in local governance because of the above amendment and reservation policy there was a broader change taking place in north Indian politics. The decade of the 1990s witnessed a wave of mobilization of groups of voters along caste lines (see Chapter 3). The newly mobilized low caste voters emerged as a politically powerful group represented by the *Bahujan Samaj Party* (BSP).

Established in 1984 the BSP is a political party exclusively representing the interests of the low caste (see Chandra (2004b)). The genesis of the party lay in trade union style low caste based movements. The initial leadership of the party came from educated, middle class, salaried SC many of whom had taken advantage of the affirmative action policies adopted since independence in India. Initially a bit player on the electoral scene the party made rapid gains with the low caste in the 1990s by using a strident anti-high caste rhetoric. The campaign slogans used by the party reflected this: *Brahmins, Thakurs and Baniyas*⁵⁵ *are thieves, the rest belong to the oppressed group and 85% ruled by 15%, this won't last*⁵⁶. Figure 3.1 shows the rapid rise of BSP in the 1990's in the state of UP. Between 1991 and 1998 the party witnessed an increase in voteshare of about 12.5 percentage points (an increase of almost a 100%). It was part of coalition governments at the provincial level in UP in 1995 and 1997.

The BSP was unhesitant in targeting public spending on the low caste group. Whenever the BSP was in power it undertook development projects targeted at the SC, and money was diverted from other projects towards those targeted at the SC. It massively expanded the already existing Ambedkar Village Project (AVP), a program for the upliftment of villages with a

⁵⁵That is the higher castes.

⁵⁶The following quote taken from the BSP website gives useful insight into its ideology: "The ideology of the Bahujan Samaj Party (BSP) is "Social Transformation and Economic Emancipation" of the "Bahujan Samaj", which comprises of the Scheduled Castes (SCs), the Scheduled Tribes (STs), the Other Backward Classes (OBCs) and Religious Minorities such as Sikhs, Muslims, Christians, Parsis and Buddhists and account for over 85 per cent of the country's total population. The people belonging to all these classes have been the victims of the 'Manuwadi' system in the country for thousands of years, under which they have been vanquished, trampled upon and forced to languish in all spheres of life. In other words, these people were deprived even of all those human rights, which had been secured for the upper caste Hindus under the age-old 'Manuwadi Social System'." (Source: www.bspindia.org accessed on March 6, 2010)

substantial SC population. “The AVP, in short, during the period when the BSP was in power, provided extra funds to the Dalits (Scheduled Caste) in our sample villages which they could utilize due to special reservations provided in the new panchayats.” (Pai (2002)). Thus the reservation of GPs fell very comfortably in line with the BSP electoral strategy as it could use these reservations to target public goods at rural low caste voters and thus solidify its electoral base. As such SC pradhans came to play an important role in the overall low caste mobilization.

Another party to emerge as the result of this caste based mobilization was the Samajwadi Party (SP). Established in 1991, the SP is a party representing the interests of the *yadavs* a Backward Agricultural but nevertheless landowning peasant caste. The *yadavs* were one of the biggest beneficiaries of the land reforms which transferred land from absentee landlords to the tenants actually farming the land. They were among the landowning cultivators that gained the most from the green revolution and became a politically powerful group (see Chapter two). Both these parties represent low caste political movements, however their interests are antagonistic. The BSP represents marginal farmers or landless casual labour whereas the SP represents a relatively richer landowning group which usually employs the former. Thus the interests of these two parties are opposed. Figure 3.1 shows the increase in SP vote share over time. The SP can be used to provide a useful robustness check for my results later. I can use the SP mobilization to see whether it is actually caste networks between BSP politicians and SC pradhans that explain my results or is it just recent political mobilization and changes in the political setup that explain them.

3.3 Theoretical framework

This section outlines a very simple model to help fix the ideas presented so far in the chapter and interpret the empirical results. The economy consists of the borrower, bank official and politicians. The timing and the structure of the game they play is as follows. The borrower has a project which requires funding. He approaches the official with a request for a loan of amount L . The official demands a part of the loan amount as bribe b as a condition for approving the loan. At this stage the borrower has three options. He can end this transaction here, in which case the game ends and there is no credit transaction. Alternatively he can agree to the bribe amount proposed by the official, pay it and get the remainder of the money. Finally the borrower can ask a politician to intervene on his behalf. This

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costs the borrower an amount $c(n)$, where n is the proportion of politicians belonging to the agent's caste group. This form of the cost reflects that the cost of approaching a politician is a function of the strength of the agent's caste network among the politicians. The cost function satisfies the following: $c(0) = c^-$, $\frac{\delta c}{\delta n} < 0$, $\frac{\delta^2 c}{\delta n^2} > 0$. It is the maximum when there are no politicians from the agent's caste group and decreases in a convex fashion after that. In the rest of discussion of the model I suppress the argument of the cost function for the sake of clarity of presentation. The politician can successfully intervene with the official (that is use his influence over the official) with a probability p . If the politician's intervention is successful then the borrower does not have to pay a bribe, he gets the full loan amount and the corrupt official has to pay a fine F ⁵⁷. At this stage the game ends.

I assume that all agents are risk neutral, so their utilities are represented by their respective monetary payoffs. The above game can be summarized by the payoffs to the agents after each of the choices made by the borrower. Let the utilities of the agents be given by u_b, u_o, u_p respectively for the borrower, the official and the politician.

If the borrower ends the transaction, then none of the involved parties get anything out of the transaction. This means that $u_b = u_o = u_p = 0$ ⁵⁸. If the borrower agrees to pay the asked bribe amount then $u_b = L - b, u_o = b, u_p = 0$. The official's payoff is the bribe he gets, the borrower's is the remaining amount from the loan and since the politician is not involved at this stage his payoff I assume to be zero.

The third case is where the borrower refuses to pay the bribe and pays a cost c to get the politician involved on his behalf. This however does not mean that the politician will always be able to impose a penalty and get the official to sanction the loan. This only happens with probability p . The borrower gets his loan sanctioned, does not pay a bribe and the official has to pay a fine F . With a probability $1-p$ however the politician cannot influence the official and the borrower has the choice of paying the bribe and getting the loan or ending the transaction. Using this we can write the utilities of the agents as follows: $u_b = L - c - (1-p)b, u_o = (1-p)b - pF, u_p = c$.

⁵⁷This fine can be thought of as reduced form way to model a reduction in the official's lifetime earnings because of incurring the politician's displeasure, because of a bureaucratic transfer to a less lucrative position for example.

⁵⁸This is a rather stylized view of things. In reality if the subsidized loan was refused then the borrower might try his luck in the informal credit market. However, what matters is that the utility to the borrower be greater when borrowing from the government than when he borrows from the informal market. This is indeed a reasonable assumption for most transactions in the informal market with their really high interest rates.

3.3. Theoretical framework

We are looking for a sub game perfect solution to the above game. I assume that $L - c - b > 0$ so that the borrower always wants to complete the credit transaction rather than end it at an earlier stage. This implies that the borrower has to decide between paying the asked bribe or engaging the politician. The borrower will engage the politician if his utility from approaching the politician is higher than his utility from paying the bribe outright, i.e if $L - c - (1 - p)b > L - b$ or $b > \frac{c}{p}$. The result is fairly intuitive, if the official asks for a very high bribe then it is optimal for the borrower to pay the cost to engage the politician and take the chance that he can successfully influence the official.

For the official it is always the case that his utility is lower if the borrower does go to the politician, since $(1 - p)b - pF = b - p(b + F) < b$. So in equilibrium he will choose the highest bribe he can without sending the borrower to the politician. Thus on the equilibrium path, the politician never gets involved. The borrower asks for a loan amount L , the official asks for a bribe $b^* = \frac{c}{p}$. The borrower pays the bribe and obtains the loan. From the expression for the equilibrium bribe, the following are obvious

- $\frac{\delta b^*}{\delta c} > 0$, so the lower the cost of approaching the politician the lower is the bribe paid in equilibrium.
- $\frac{\delta b^*}{\delta p} < 0$, which implies that the lower the probability of intervention the higher is the bribe paid. In particular as $p \rightarrow 0, b^* \rightarrow L - c$, the highest amount the official can extract.

Traditionally politicians, bureaucrats and other government officials in India have been drawn from its upper or middle castes, but the recent rise of low caste parties means that there are increasingly more politicians from the lower castes. This implies that for an agent from a high caste the proportion of politicians from his own caste group, n_{high} , would be close to one whereas for a low caste agent, the strength of his network n_{low} is close to zero to begin with but is increasing with the recent political developments. This has a number of implications for observed bribe amounts in the data: first, on average the bribe amount paid by low caste borrowers should be higher when compared to the bribe paid by high caste agents, second the bribe amount should be lower for low caste borrowers living in villages with stronger networks and finally the change in the bribe paid by high caste borrowers may be small even with the recent weakening of their networks (as more low caste people enter politics or public service) because of the convex nature of the cost and the fact that the initial strength of the high caste network was close to one.

3.4 Empirical estimation

The first empirical task in this chapter is to test whether average bribe amounts paid differ by caste groups as we would expect from the model. To do so I estimate the following equation

$$Bribeamount_{ij} = \alpha + \sum_k \beta_k caste_{ijk} + \gamma X_{ij} + \omega_j + \epsilon_{ij} \quad (3.1)$$

Here i indexes the HH and j the village the HH resides in. k indexes the various caste groups. The dependent variable is the bribe amount paid to obtain the IRDP loan. $caste_{ijk}$ are dummy variables which take the value 1 if the HH belongs to the particular caste group indexed by k and 0 otherwise, X_{ij} are various HH level controls and ω_j are the village fixed effects. ϵ_{ij} is an individual level mean zero error term. The co-efficients of interest are β_k .

The results of the estimation are provided in Table 3.5. The excluded group in all the estimations is the high caste group and the dependent variable is the bribe amount paid to obtain the IRDP loan. Column(1) estimates the equation on the full sample of UP and Bihar while column (2) only uses data from UP. Neither of these estimations include additional controls. Columns (3) and (4) use the full sample but also include additional controls with column (4) also including the loan amount as an additional control. The point estimate on the SC dummy is positive and significant in all these specifications. Thus compared to the high caste group (and other caste groups, as the points estimates on BAC and Back Other are statistically indistinguishable from the excluded group) SC HHs pay higher bribes to obtain similar loan amounts. Column (5) includes village fixed effects along with HH level controls. This is a strong demand on this data but still the point estimate on the dummy for SC is positive and almost significant (with a p-value of 0.11). The point estimates are also significant economically; depending on the specification SC pay INR 600-800 more in bribes to obtain similar loan amounts. Given that the average bribe amount is about INR 1750 this amounts to about 34-44% of the average amount. For the sake of brevity I do not report the point estimates on the HH level controls in the table, but the results are unsurprising. Those points estimates suggest that richer HHs pay lower bribes. HHs with higher income and those who own a house pay significantly lower bribes than other HHs.

Arguably in the GPs reserved for SC *pradhans* the strength of the political network of the SC HHs has increased thus lowering the cost of engaging a politician and the resulting IRDP bribe. Hence comparing the average

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bribe paid by SC HHs across these two sets of villages should give indicate whether the presence of an SC politician has any effect on bribe as we would expect from the model. Since this reservation policy was exogenously introduced we can give a causal interpretation to the estimates (after controlling for the proportion of SC in villages). Thus I estimate equation 3.2 for SC HHs

$$Bribeamount_{ij} = \alpha + \beta d_j + \gamma V_j + \epsilon_{ij} \quad (3.2)$$

Here i, j index the HH and village respectively, d_j is a dummy which is 1 if the village is reserved and 0 otherwise. V_j contains village level characteristics (most importantly the proportion of SC in the village). I expect that $\beta < 0$ as in reserved villages, SC households should be paying a lower bribe on average.

Given the entrenched hierarchal caste system and concentration of power within a few elites, scholars have questioned the real effectiveness of caste based reservations. An important contribution of this chapter is to provide further insight into how these new *pradhans* could have gained political power despite the presence of elite. I hypothesize that the wider low caste movement taking place at the same time which was resulting in changes at the provincial and national levels of politics interacted with these reservations to generate the observed effects. To look at the effect of interaction of reservations with the wider BSP movement I estimate equation 3.3

$$Bribeamount_{ijk} = \alpha + \beta d_j + \gamma VS_k + \delta (d_j \times VS_k) + \eta V_j + \epsilon_{ijk} \quad (3.3)$$

Here i, j, k respectively index the HH, village and district. As before, d_j is a dummy which is 1 if the village is reserved and V_j contains village level characteristics. VS_k is the BSP vote share in district k in which the village j is located. I expect that $\delta < 0$ the coefficient on the interaction between the reservation status and BSP vote share is negative. If a reserved village falls in district with a higher BSP vote share I expect that SC households in that village pay lower bribes on average than a village which falls in a district with a lower BSP vote share.

Table 3.5 shows the results for equation 3.2. Column (1) reports the results for sample of SC HHs and controls for the proportion of SC HHs in the village. The point estimate on the reservation dummy is negative and significant confirming that the average bribe paid by SC HHs living in reserved villages is lower than that paid by SC HHs living in unreserved villages. Column (2) reports results from a similar regression but includes

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some HHs characteristics as controls. As already shown in Table 3.4 the two sets of villages are the same on most characteristics. Thus adding these controls just increases the significance of the results by absorbing residual variation. Columns (3) and (4) report results for running a pooled regression for all castes and adding a dummy for SC HHs living in reserved villages. The omitted group is the other caste (all but SC). As expected the point estimate on this dummy is negative and significant. Finally the last column shows the result of a similar estimation but for the other castes this time. There is no effect on the bribe amount. This tells us two things; firstly, caste ties matter, as only SC households gain from SC *pradhans* and secondly, that it is not the case that the new SC *pradhans* are in any way more efficient or effective at governance as the bribes are not reduced across the board.

Before estimating equation 3.3 a potential endogeneity concern needs to be addressed. The *panchayati raj* regulation was introduced in 1994 and the elections were held in 1995. The data used in this chapter comes from 1997-98. Now the closest parliamentary elections (vote share data comes from the parliamentary elections, which I use as the measure of political mobilization) were those held in 1996, which is *after* the GP elections. The use of the 1996 BSP vote share as a measure of political mobilization (I want to use the vote share closest to the period of study to capture contemporaneous mobilization) suffers from the problem that the regulation could potentially have affected both the 1996 vote share and the bribe amount. I deal with this in two ways:

- Use the 1991 vote share as a proxy for BSP's political mobilization⁵⁹.
- Using an instrumental variable strategy. I use 1991 and 1989 BSP vote shares as an IV for the 1996 vote share.

Table 3.7 reports the estimates for equation 3.3. Columns (1) and (2) use the 1991 BSP vote share, column (3) uses the 1996 vote share and the last column uses the 1991 vote share as an instrument for the 1996 vote share. The point estimates are fairly similar across specifications. The first thing to note is that the coefficient on the reservation status dummy is insignificant. So all the effect that reservation for SC *pradhans* has comes from this interaction, there would be no effect on the bribe amount paid by SC households living in a (hypothetical) district with zero BSP vote share. Also in all the specifications the coefficient on the interaction is

⁵⁹This is reasonable since vote share has a lot of persistence. In fact the correlation between the 1991 and 1996 vote shares is 0.91

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negative and statistically significant. The coefficient implies that moving from a reserved village located in a district with average BSP vote share to a reserved village located in a district with vote share one standard deviation away from the mean would change the bribe amount by about INR 240, a substantial number.

How should we interpret this interaction? First as the results on the dummy for reservation in the above regression suggest, the *pradhans* on their own do not possess enough clout to influence local officials (in terms of the model they do not have a sufficiently high probability p). However this probability increases with an increase in strength of low caste mobilization (as measured by BSP vote share). Thus SC HHs living in reserved GPs are able to call on a network of the SC *pradhan* and elected SC officials and politicians at block and district level. The increased importance of SC *pradhans* in BSP's mobilization strategy has already been discussed in a previous section. Thus it is very plausible that these contemporaneous political changes at two different levels of government allowed the emergence of a network of low caste politicians.

I do not explicitly model the source of the influence of politicians over bureaucrats and officials. However it is widely recognized that politicians in India have an unhealthy amount of influence over bureaucrats. This is achieved in part by politically motivated political transfers (Banik (2001))⁶⁰. A recent paper by Iyer and Mani (2009) looks at how politicians control bureaucrats using transfers.

The presence of programs such as the AVP implies that SC *pradhans* may be better at procuring more resources for their villages from a BSP government. These resources which under the BSP could be openly targeted towards the SC would reduce the competition between SC households thus reducing the bribes. I do not find any conclusive evidence for this in the data. In Table 3.8 I estimate an equation similar to 3.3 but with the total IRDP allocation to a village as a dependent variable. I also used the total allocation in the village on employment schemes as a dependent variable.

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Instead of posting officers to underdeveloped areas on merit and proven ability, unwanted officers are sent on 'punishment' assignments. When these officers are aware that they have been 'victimized', it is difficult for them to remain committed to their duties and become involved in the genuine welfare of the area. In such situations the officer has the option of aligning himself with a political patron who can get him a more stable and desirable posting

Again I find no evidence that reserved villages get significantly more funds.

The next section provides some additional robustness checks and looks at possible alternative explanations.

3.4.1 Robustness checks

Using SP vote share: As already discussed the SP is another low caste based political party that emerged in the 1990's. This was part of increasing ethnicization in Indian politics. In some ways the growth of the SP was very similar to the BSP, but the important difference is that while one party represents the landed peasantry (the SP) the other represents the landless workers (the BSP). Thus the parties' interests are antagonistic to each other and the caste identification of the two groups to their respective parties is really strong.

Now if it was the case that caste identification of parties to their constituency (my preferred explanation for the BSP-SC borrower interaction) was not important but what mattered was a change in the established political system (i.e a challenge to the high caste led parties) and an increase in the political representation of low castes, then we should expect to find similar results if I use SP vote share instead of BSP vote share. In districts where the SP vote share is high, that is the new political movement has a stronger base, SC borrowers should on an average pay lower bribes in reserved villages. Table 3.9 provides the results of estimating equation 3.3 but with SP vote share instead of BSP vote share. I find no significant effect on the bribe amount paid by the SC. This lends support to the idea extended in this chapter and suggests that it is indeed the caste networks in politics that are important in explaining the better outcomes for SC.

Is the panchayat really needed? It might be the case that all SC households living in districts with a higher BSP vote share are better off, regardless of whether they live in reserved or unreserved villages. Then picking any village in a high vote share district and comparing it with a lower vote share district would give results similar to mine. To see this I look at the relationship between average bribe amount and BSP vote share. Figure 3.2 shows the results. There does not seem to be any significant correlation between the two variables. So it is the interaction between the lowest level of government and the broader political movement that is important in explaining the results. This is sensible for without the presence of a middleman, the village pradhan, it would be prohibitively costly for a poor SC farmer living in a village to engage a district level politician on his behalf.

The SC are more likely to default: On a more general level it

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is possible that the poor and lower castes are bigger risks for banks as borrowers, hence the need for subsidized and targeted credit schemes. Even so it may be the case that banks are more reluctant to lend to SC borrowers as they have a higher probability of default (there is no collateral in the IRDP scheme hence that can't be used to lower the probability of default) hence they have to pay a higher bribe to obtain loans. This could explain the difference between the bribes observed.

In the data the borrowers were asked if they had started repaying their IRDP loans. There is no other information on loan default. On the basis of responses to the above question I fail to find any pattern in loan default by caste. SC are no more or less likely to have started repaying than other caste groups. Still, even if a higher risk of default by the SC was the reason for higher bribes for them it would not explain why the bribe amounts fall in reserved villages. The SC borrowers are very unlikely to become more productive in reserved villages in a matter of 2-3 years (the first GP elections after the reservations were held in 1995 and the data comes from 1997-98). The much more likely explanation is the one advanced in the chapter, that the lower bribes are a result of increased SC political presence.

3.5 Concluding comments

Caste disparities in India are a well known fact in the social science literature. Lower castes (in this chapter identified by the Scheduled caste group) perform worse than other castes on almost all observable social and economic parameters. But does their social status also affect them indirectly? Bureaucratic corruption is ever present in India, and one way agents deal with corrupt officials is by calling on the help of influential people in their social networks to intervene with corrupt officials on their behalf. If this is indeed the case then low castes who have traditionally had little representation in government and politics should be exposed more to corruption.

The evidence presented in this chapter, although indirect, supports this idea. Low caste borrowers pay higher bribes on average when compared to high castes. However those living in reserved villages, who were able to take advantage of the newly emerged network of low caste politicians see a reduction in the bribe amounts they pay commensurate with a reduction in cost of approaching a politician.

This chapter also provides evidence for an indirect effect of the BSP mobilization on economic outcomes of the low caste agents.

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Table 3.2: Caste composition of sample

	Number of HHs	Percent of Sample
High Caste	157	12.91
Middle caste	19	1.56
BAC	365	30.02
Backward Other	237	19.49
SC	352	28.95
Muslim Upper	33	2.71
Muslim Lower	53	4.36

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Table 3.3: Summary statistics

Variable	Mean	Std. Dev.	Obs.
<i>Panel A: HH characteristics</i>			
HH size	6.381	3.477	1217
ln(Income per HH member	5.845	0.49	1214
Total Land owned (in acres)	3.193	5.705	1036
Irrigated Land (in acres)	2.289	3.976	988
Education	4.61	2.581	1217
Own a pump (Yes=1,No=0)	0.221	0.415	1022
Num of daughters	0.832	1.1	1217
Medical emergency during RP (Yes=1,No=0)	0.636	0.481	1210
Livestock owned (Yes=1,No=0)	0.77	0.042	1213
Pucca dwelling	2.23	1.05	1217
IRDP loan amount ('000 Rs.)	9.73	13.78	223
Bribe amount ('000 Rs.)	1.74	1.57	188
<i>Panel B: Village characteristics</i>			
Telephone	0.242	0.43	120
Police station	0.017	0.129	120
Bank	0.058	0.235	120
Public primary school	0.792	0.408	120
Public health center	0.125	0.332	120
Percentage of HHs with off farm employment	39.586	25.88	116
Electricity	0.529	0.501	119
No. of HH in village	257.283	163.680	120
Proportion of SC	0.274	0.208	120

Notes: *Pucca dwelling* is a categorical variable ranging between 1 and 5 (1 being the worst form of housing and 5 being the best). The loan and bribe amounts are given in '000 Rs.. The public good variables for the village are dummies indicating whether the village has access to that particular public good.

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Table 3.4: Differences between reserved and unreserved villages

Variable	Reserved	Unreserved	Difference
No. of HH in village	242.86	228.17	14.4(0.734)
Proportion of SC	0.43	0.25	0.18(0.002)
Avg. income in village(Rs.)	2519.78	2308.44	211.34(0.315)
Avg. land holding(acres)	3.09	3.08	0.01(0.986)
Percentage of HHs with off farm employment	51.4	37.26	14.14(0.095)
Telephone	0.31	0.13	0.19(0.095)
Police station	0	0.02	-0.02(0.564)
Bank	0	0.04	-0.04(0.41)
Public primary school	0.75	0.68	0.07(0.61)
Public health center	0.13	0.04	0.08(0.25)
Electricity	0.56	0.62	-0.05(0.706)
IRDP loan amt ('000 Rs.)	11.79	8.89	2.9(0.204)
IRDP loan amt SC ('000 Rs.)	7.92	7.27	0.65(0.57)
IRDP bribe amt ('000 Rs.)	1.88	1.69	.19(0.46)
IRDP bribe amt SC ('000 Rs.)	2.02	2.66	-.64(0.088)

The p-values for the differences are reported in the parentheses. The public good variables are dummies of whether the village has access to that particular public good or not.

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Table 3.5: Differences in bribe amounts ('000 Rs.) paid by caste group

	Full Sample	Only UP—	Full Sample		
BAC	0.22 (0.36)	0.01 (0.45)	-0.03 (0.31)	0.17 (0.33)	-0.52 (0.77)
Back Other	0.27 (0.41)	-0.04 (0.57)	-0.12 (0.50)	0.04 (0.50)	-1.03 (1.11)
SC	0.72 (0.33)**	0.85 (0.42)**	0.61 (0.37)*	0.80 (0.37)**	0.80 (0.6)
IRDP loan amount				.02 (.02)	.03 (.02)
Controls	No	No	Yes	Yes	Yes
Fixed effects	No	No	No	No	Yes
Constant	1.24 (0.28)***	1.45 (0.36)***	5.91 (2.71)**	6.13 (2.69)**	5.01 (3.9)
Obs.	182	105	134	134	134
Clusters					59
R-squared	.033	.154	.158	.185	.195

Notes: The unit of observation is the household (HH). The data include HHs who have taken an IRDP loan. The omitted category is the high caste group. Robust standard errors are reported in the parentheses. Controls include age, sex (=1 if female) and educational attainment (illiterate, primary school, high school, diploma, graduate) of head of HH, HH size, total land owned, irrigated land owned, ln (income per HH member), Livestock owned, own a house (yes=1), pucca dwelling (yes=1). *Proportion SC* is the proportion of SC living in the village in which the HH is resident. The second column includes data only for the state of Uttar Pradesh (UP). The fourth and fifth columns along with the above mentioned controls also include the IRDP loan amount as a control. The last column includes village fixed effects with standard errors clustered at the village level. Addition of various controls reduces the sample size in the last two columns. *, **, *** denote significance at the 10%, 5% and 1% level respectively. In the last column the p-value on the point estimate for SC is 0.18.

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Table 3.6: Bribe paid by reservation status of village

	Bribe amount ('000 Rs.)		Bribe amount ('000 Rs.)		
	SC		other castes		
Reserved village (Yes=1, No=0)	-0.81 (0.47)*	-1.02 (0.51)**			0.02 (0.64)
Is HH SC (Yes=1, No=0)			1.21 (0.46)***	0.90 (0.57)	
SC HH X reserved			-0.76 (0.42)*	-0.94 (0.49)*	
Proportion of SC	1.3 (1.72)	1.25 (1.76)	0.87 (0.88)	0.74 (0.92)	-0.76 (1.21)
Constant	2.19 (0.74)***	8.78 (3.94)**	1.14 (0.48)**	7.33 (2.5)***	1.99 (0.45)***
Controls	No	Yes	No	Yes	No
Obs.	57	47	111	94	54
R-squared	.05	.15	.17	.3	.008

Notes: The unit of observation is the HH. Standard errors are clustered at the village level to account for correlation across HHs in the same village. Controls added as a robustness check include age, sex (=1 if female) and educational attainment (illiterate, primary school, high school, diploma, graduate) of head of HH, HH size, total land owned, irrigated land owned, ln (income per HH member), Livestock owned, own a house (yes=1), pucca dwelling (yes=1). *Proportion SC* is the proportion of SC living in the village in which the HH is resident. All data are taken from the state of UP only. For the first two columns the data units are SC HHs who have taken an IRDP loan. Columns (3) and (4) report results from a pooled regression of all HHs, while the last column includes HHs belonging to castes other than SC. *, **, *** denote significance at the 10%, 5% and 1% level respectively.

3.5. Concluding comments

Table 3.7: Interaction of reservation status with BSP vote share
Bribe amount ('000 INR)

Reserved village (Yes=1, No=0)	0.93 (0.72)	0.56 (0.63)	1.87 (1.33)	2.19 (1.58)
Reservation X BSP vote share	-0.1 (0.06)*	-0.09 (0.06) ⁺	-0.11 (0.06)*	-0.12 (0.07)*
Proportion SC		1.75 (1.17)	0.74 (1.54)	0.69 (1.53)
BSP vote share	0.07 (.06)	0.06 (0.05)	0.06 (.05)	0.07 (0.06)
Constant	1.53 (0.64)**	1.08 (0.75)	1.57 (0.81)**	1.51 (0.85)*
Obs.	53	53	53	53
R-squared	.04	.08	.09	.09

Notes: For columns (1) and (2) the BSP vote share from 1991 elections is used. For column (3) the BSP vote share in 1996 is used. In the last column the BSP vote share in 1991 is used as an instrument for the BSP vote share in 1996. The standard errors are clustered at the village level. *Proportion SC* is the proportion of SC living in the village in which the HH is resident. +, *, **, *** denote significance at the 15%, 10%, 5% and 1% level respectively.

3.5. Concluding comments

Table 3.8: Effect of reservation on total IRDP allocation

	Total IRDP allocation in village			
Reserved Village (Yes=1, No=0)	25.17 (12.43)**	23.02 (14.56)	40.36 (28.18)	39.95 (29.21)
Reservation X BSP vote share			-1.25 (1.48)	-1.31 (1.42)
No. of HHs		.05 (.04)		
Proportion SC		1.67 (28.98)		7.52 (24.57)
Constant	18.62 (3.72)***	6.03 (7.23)	18.62 (3.72)***	16.72 (6.28)***
Obs.	59	59	59	59
R-squared	.11	.16	.15	.15

Notes: The dependent variable is the total IRDP allocation in village in '000 INR. *Proportion SC* is the proportion of SC living in the village in which the HH is resident. *No. of HH* is the total no of HHs resident in the village. The BSP vote share from 1991 is used. *, **, *** denote significance at the 10%, 5% and 1% level respectively.

3.5. Concluding comments

Table 3.9: Interaction of reservation status with *Samajwadi Party* vote share in 1996

	Bribe amount (1)	Bribe amount (2)	Bribe amount (3)	Bribe amount (4)
Reserved village (Yes=1, No=0)	-518.01 (508.77)	-704.38 (547.92)	-669.04 (567.32)	-221.46 (402.63)
Reserved X Vote share of SP	-9.17 (14.04)	-7.76 (14.55)	-9.49 (17.59)	-11.99 (17.27)
Proportion of SC		1264.82 (1735.06)	2164.86 (1494.69)	1054.98 (958.73)
Constant	2662.5 (383.91)***	2204.67 (746.04)***	1706.79 (517.29)***	1854.96 (465.82)***
Obs.	57	57	53	50
R squared	.039	.051	.073	.033

Notes: The unit of observation is the HH. The reservation status of the village is interacted with the *Samajwadi Party* (SP) vote share from 1996. *, **, *** denote significance at the 10%, 5% and 1% level respectively.

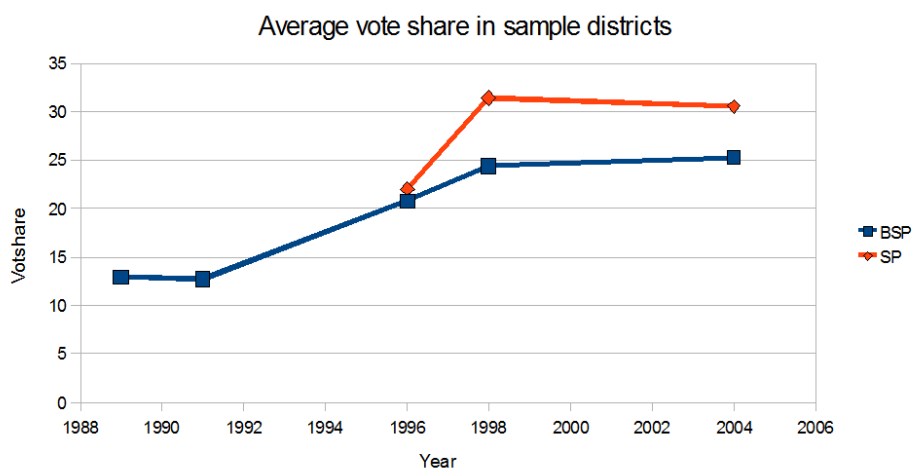


Figure 3.1: Vote share in sample districts weighted by valid votes cast

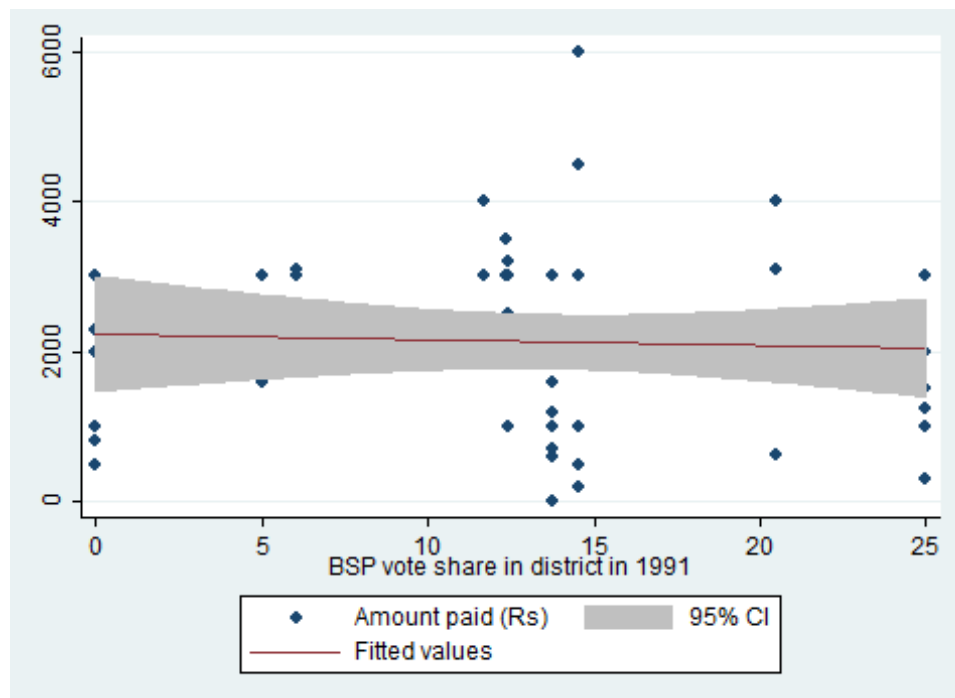


Figure 3.2: Bribe amount against BSP vote share in district

Chapter 4

Polarization and Ethnic Voting

Introduction

The political economy literature has seen a recent upsurge of interest in understanding the causes, consequences and means of reducing the incidence of ethnic voting or ethnicization in politics, defined as voter preference to vote for the party that represents their ethnic group (Banerjee and Pande (2009), Banerjee et al. (2010), Banerjee et al. (2011), Casey (2010), Pande (2011)).

In spite of this burgeoning literature, there is a lack of systematic empirical studies that try and understand the reason behind voter motivation for ethnic voting⁶¹. Conceptually, the starting point for this chapter is a fairly basic question: Is the case that, when living in a setting where politicians have the ability to target goods and services towards ethnic groups, the growing strength of a competing ethnic group compels voters towards ethnic parties representing their group? To empirically investigate this question one needs a measure summarizing the distribution of ethnic groups that can capture this idea of social tensions and inter group competition.

To do so I borrow from an extensive literature on ethnic conflict. Conflict studies have previously used an index of **ethnic polarization** as a measure of competition between ethnic groups that can lead to eruption of conflict as groups vie for control over scarce economic resources. As Esteban and Ray (1994) point out “Our contention is that polarization, as conceptualized here, is closely related to the generation of social tensions, to the possibilities of revolution and revolt, and to the existence of social unrest in general.”

In this chapter I use an index of polarization as a measure of ethnic tensions. Using political developments in India from the 1990’s, when ethnic

⁶¹Ferree (2004) suggests that ethnic voting may ultimately be traced to policy based incentives, Ishiyama (2011) finds that the degree to which a group is discriminated against and politically mobilized explains bloc voting against the governing party

parties witnessed a sharp rise in their vote shares, I test whether these increases in support for ethnic parties were related to ethnic polarization. This index is a simplified version of the general index of Esteban and Ray (1994), previously used by Montalvo and Reynal-Querol (2005b).

Using data from North India from 1989 to 1996 I find that constituencies which were more polarized saw bigger increases in support for ethnic parties and bigger decreases in the vote share of the multi-ethnic Congress party.

The rest of the chapter is organized as follows: section 1 discusses the political background of the study, section 2 presents a conceptual framework, section 3 briefly discusses the data and variables, section 4 presents the results while section 5 concludes.

4.1 Political background

The paper discusses political developments in India from the late 1980's to the early 1990's. This period was marked by the growth of the Hindu nationalist *Bhartiya Janata Party* (BJP) and various political parties obtaining their support from lower caste voters such as the *Bahujan Samaj Party* (BSP) and the *Samajwadi Party* (SP). Presence of religious and caste consciousness in politics is not new to India. Hindu nationalist parties (such as the Hindu Mahasabha) have a long history in Indian politics (pre-dating independence from colonial rule) as do caste based parties (such as Dr. B. R Ambedkar's Republican party of India). But these parties never enjoyed much electoral success. The Indian National Congress (henceforth the Congress) had been able to successfully mediate the differences between these various groups and bring them together under one dominant political party.

However the Congress had been on the decline since the late 1960's. Peasant mobilization following the introduction of HYV technology had already resulted in the migration of certain rural sections of voters away from the Congress and towards parties such as the Janata (see Chapter 2 of the thesis). That decline was accompanied by a change in the Congress internal structure and the party had lost a lot of the political vitality of earlier years. "By the 1990's the Congress had lost this mantle because of its perceived corruption and inefficiency, and its factionalism. It was for this reason amongst others, perhaps that the BJP also began to win support not only from its base in the trading castes but also from prominent executives, ex-servicemen and former top administrators" (Corbridge and Harriss (2000))

4.1.1 Mandal commission and the rise of the BJP

India was witnessing a poor economic situation in the late 1980's. In 1982 India's total public external debt stood at 7.94 billion dollars, or 11.4% of GNP. By 1990 this had shot up to 70.12 billion dollars and the debt GNP ratio was 27.94%. Scholars blamed the inefficiency of central planning, extensive bureaucratic controls over economic activity, inward looking trade and foreign policy and a substantial and inefficient public sector and were calling for economic reforms (Bhagwati (1993)). As mentioned previously India's middle classes (consisting mostly of upper and middle castes) had grown disillusioned with the Congress for its inability to better the economic situation and look after their interests. The right wing BJP presented these people with a political alternative: a message of a strong India based on the ideals of Hindu Nationalism. Popular sentiment echoed this idea - "We have reached rock bottom in world stature, economically, in every way. If the BJP is an alternative to a better end then so be it." (Unnamed Indian business man, India Today, 15 May 1991).

While the general economic situation provided one of the reasons for the mobilization of upper and middle caste Hindus behind the BJP, another was the growing economic and political assertiveness of the lower castes. "Part of the reason for the appeal of Hindu nationalism to elites in Indian society is that *Hindutva* threatens to subdue the plebeian assertiveness of the political leadership created by India's democratic revolution."

One of the arguments this paper makes and provides evidence for is the role played by affirmative action policies (extension of reservation in government jobs and institutions to OBC groups) in the Hindu mobilization.

4.2 The Mandal commission

Positive discrimination policies in India date back to the British period. The first program that aimed to advance the education of the untouchables⁶² was started in 1892 by the British. This took the form of special schools for these groups, because of the failure of the public school system to accommodate them due to general rejection of these students by teachers and pupil's parents. The British also introduced reservations in political representation in 1919 (Jaffrelot). Later, in the 1930s, these were extended by reserving a certain number of constituencies for candidates from the untouchable group.

Post independence these programs were continued with minimal changes.

⁶²The ritually impure castes, the lowest in the caste hierarchy

The castes belonging to the untouchable group were included in a schedule of the Indian constitution (hence the often used bureaucratic euphemism the “scheduled castes” (SC)) which reserved seats in various government bodies for them. The only significant change was extending the policy of reservations to the tribal people (the scheduled tribes). These affirmative action policies were non-controversial and generally widely accepted⁶³

While affirmative action policies targeting the SC group were widely acceptable and non controversial extending these to other groups in society has been a highly debated topic. The question of whether and how should affirmative action policies targeting lower castes except untouchables be framed is an old one specially in southern India (Jaffrelot (2006)). The Madras Presidency, the modern Indian state of Tamil Nadu, was where the term “Backward classes” meaning “Castes other than depressed castes” was first used. This question remained a thorny one after independence. Nehru was not in favor of using caste as a criterion for identifying what he termed the “Other Backward Classes”.

In 1953, the Kalelkar commission, the first Backward classes commission was appointed. After working for months, the commission decided that its main criterion for deciding social backwardness all boiled to one thing: caste. The commission thus drew up a list of 2399 castes belonging to the Other Backward classes (OBC) and recommended reservations for them in government services and educational institutions (Jaffrelot (2006), Chhibber (2001)). The Congress government under Nehru was reluctant to extend caste based reservations and the report of the commission was shelved.

With the electoral success of the Janata (see chapter 2 of the thesis) and its socialist leaders the demand for reservations for the OBC was again revived (Jaffrelot (2006))⁶⁴. When the Janata assumed power in 1977 it formed a new Backward classes commission. In December 1978 a second Backward Classes commission was appointed presided over by B. P. Mandal. The commission again considered caste as the relevant criterion for extending reservations and in its report identified 3,743 castes that it found to form India’s OBC, representing 52% of its population. It recommended that 27% of public sector jobs be reserved for OBCs (Jaffrelot (2006)).

⁶³Jaffrelot (2006) argues that the reason the elites in India did not mind the reservations for the scheduled castes and tribes was that they were largely ineffective and this engendered the belief that this group could never challenge the elites.

⁶⁴One of the reasons for this might have been that the Janata group not only drew its support from particular classes, for example the medium peasantry in North India, but also particular caste groups. These newly rich rural groups were keen to take the next step in upward social mobility by securing white collar public sector jobs (Jaffrelot (2000))

However by the time the commission presented its report the Congress had again assumed power and managed to sweep the report under the carpet. In 1989, the Janata Dal, the ideological successor to the Janata Party assumed power and its leader, V. P. Singh, announced the implementation of the recommendations of the Mandal commission. Singh did not conceal the fact that the effect of the reservations would be as much political as economic. “We believe that no section can be uplifted merely by money. They can develop only if they have a share in power and we are prepared to provide this share...Bureaucracy is an important organ of the power structure. It has a decisive role in decision making. We want to give an effective[sic] here in the power structure and running of the country to the depressed, down-trodden and backward people.” (Prime Minister’s Independence day speech, 15 Aug 1990)

The opposition to the policy was immediate. There were violent protests and street demonstrations by upper caste students against loss of job opportunities. All together there were about 63 cases of self immolation by upper caste students (Jaffrelot (2006)). The antipathy of the BJP to some aspects of the Mandal commission report was well known ((Corbridge and Harriss, 2000, p.129)). In the face of Congress vacillation to the reservations issue many upper and middle caste Hindus, specially in North India, turned to the BJP. Seeing an opportunity the BJP stepped up its right wing Hindu rhetoric in an attempt to mobilize these voters who were disillusioned by the Congress and fearful of a challenge to their economic and political dominance.

This mobilization strategy helped the party reap rich dividends. Figure 4.1 shows the vote share of BJP in parliamentary elections from 1984 to 2004. There is a dramatic increase in the BJP vote share over the course of just one election cycle from 1989 to 1991. The average BJP vote share in the 1989 and 1991 elections is 7%; this increased to 30.5% in the post 1989 elections. The success of the BJP was thus not gradual but the result of a big group of voters changing their voting behavior over the course of a short period of time.

The upper caste resistance to the extension of reservations triggered, for the first time, a political mobilization among the lower castes to defend reservation quotas they were fearful of losing. The abstract bureaucratic category of OBCs thus became a focal point for co-ordination and acquired political substance. “In such a context of social polarization, the untouchables, who feared paying the price of a more generalized reaction to the rationale of positive discrimination sided with the OBC’s” (Jaffrelot (2006)). These lower caste voters responded favourably to the caste based mobiliza-

tion strategies of the Bahujan Samaj Party (BSP). Figure 4.1 shows the evolution of BSP vote share over time. As in the case of the BJP the vote share of the BSP increased suddenly over the course of just one election, from 1991 to 1996.

4.3 Conceptual framework and empirical estimation

The aim of the empirical exercise in this chapter is to use the political developments in India between 1989 and 1996 (that is the sharp and sudden success of ethnic parties) to answer a simple question: what motivates voters to vote along ethnic lines and what explains the success of electoral strategies based on ethnic mobilization. The preceding discussion suggests that part of the reason is contextual. Chandra (2004b) in her theory for ethnic voting suggests that a crucial element for voters to vote along ethnic lines is the presence of what she calls “patronage democracies”. “By the term “patronage-democracy” I mean a democracy in which the state monopolizes the access to jobs and services, *and* in which elected officials have a discretion in the implementation of laws allocating the jobs and services at the disposal of the state.” ((Chandra, 2004b, p. 6)).

While Chandra (2004a) makes a claim that India does indeed accord with her definition of patronage democracy and elected officials indeed have a lot of discretion in allocating jobs and services it is not really important for the state to monopolize access to jobs. A collective belief that public sector jobs accord some security and social status is enough. Such a belief can make these jobs coveted and hence losing them (because of some affirmative action policy say) can generate exactly the sentiments that were seen among upper caste Hindus after the Mandal commission⁶⁵.

Chandra (2004b) suggests that the reason for ethnic voting is that the ethnic identity of the candidate conveys important information to the voter. Though this chapter proposes a different reason for ethnic voting, the important role of the state in providing access to jobs and services and the ability to target this patronage to different groups of voters means that control of the state machinery is a valuable resource for competing ethnic groups, and

⁶⁵As (Corbridge and Harriss, 2000, p. 126) notes “Public sector jobs in India are much sought after and are regarded by many high caste men (and some women) as a bulwark against the uncertainties of life in the country’s private sector. As one respondent told the anthropologist Jonathan Parry when he was working at the public sector steel plant in Bhilai, there was ‘no mother or father like it’ (Parry (1996))”

this feature of the setting is important to both stories.

The presence of a multi-ethnic party such as the Congress and its ability to meet the demands of competing ethnic groups meant that ethnic parties were unable to extend their support beyond a narrow base from 1947 to 1989. However, the weakening of the Congress in the previous decade (because of the spread of the green revolution) and the potential emergence of a new more vocal low caste group of voters following the extension of the affirmative action policy forced the upper and middle caste (and class) Hindu voters to abandon the Congress in favour of the BJP. This group of voters perceived increased potential competition for scarce resources from low caste voters. A multi-ethnic party like the Congress can only satisfy increasingly polarized voter preferences up to a certain point. Thus the upper caste voters migrated to the BJP, which, because it represented narrower voter interests than the Congress, could adopt more extreme policy stands.

Now, the low caste and Muslim voters witnessing the success of the BJP and the increasingly extreme stand of upper caste voters had two choices. They could stay with the Congress or vote for a smaller but low caste ethnic party, the BSP. A multi-ethnic party needs the support of voters from all groups to win. The migration of upper caste Hindu voters to the BJP implied a much lower probability of success of the Congress. In this scenario, the BSP with its openly ethnic stand became a much more favourable option.

Thus this chapter proposes the competition between ethnic groups over economic resources as the reason for the success of ethnic mobilization strategies. Esteban and Ray (1994) conceptualize polarization as the sum of interpersonal ‘antagonisms’ which result from the interaction of an individual’s identification with his own group and her sense of alienation with members of another group. In Esteban and Ray (2008) they provide a model of conflict in which polarization naturally emerges as the measure on which the intensity of conflict between groups depends.

Montalvo and Reynal-Querol (2005a) provide another justification for the polarization index. As they note in the paper, “rent seeking models point out that social costs are higher and social tensions emerge more easily when the population is distributed in two groups of equal size.” They also show that the index which is used in this chapter can be derived from a simple rent seeking model.

I extend the above reasoning from models of conflict to the electoral process. A voter’s decision to support an ethnic party will depend on the relative strengths of competing groups within her political jurisdiction, her sense of alienation from members of the other group and her identification with her group. The polarization measure captures these very well and

4.3. Conceptual framework and empirical estimation

hence the support for an ethnic party in a jurisdiction should be related to the polarization in that jurisdiction.

In this chapter I look at *changes* in vote share of ethnic parties over one election cycle and look at what variables explain that *change*, in particular how do these changes in vote shares relate to polarization. The drawback with such an approach is of course that it cannot provide explanations as to the timing of the global events that trigger increasing political polarization (such as the implementation of the affirmative action policy, or demands for the building of the temple), which is often the question in a lot of political studies. Instead it looks at the differential impact of these events across different districts and studies what characteristics of districts explain these differences, providing some insight into voter behaviour regarding ethnic voting. Thus I estimate the following regressions

$$\Delta V_{ji} = \alpha + \beta.polarization_i + \gamma.X_i + \epsilon_i \quad (4.1)$$

Here i indexes districts. ΔV_{ji} is the change in vote share of party j , $j \in \{BJP, BSP, Congress\}$, in district i between elections. The main coefficient of interest is β . X_i are additional controls.

The timing of events discussed above suggests implementing the estimation procedure in two steps. The first uses the change in vote share of BJP from 1989 to 1991 as the primary dependent variable. After investigating what variables predict the increase in BJP vote share the second step is to look at the change in the vote share of the caste based ethnic party, the BSP, from 1991 to 1996 as that is the election when the vote share of the BSP sees the maximum change.

Two things are worth pointing out about the above estimation procedure. First is its contrast with using a procedure that relies on the *level* of support for a party (as measured by its vote share) rather than the *change* in that support. Investigating what triggers the change in support of an ethnic party gives us insight into the voting behaviour of a group of rational voters who switch their support from a non-ethnic party to an ethnic party rather than clubbing together both rational and partisan voters as would be the case if we used the level rather than the change. It could very well be the case that the partisan support for an ethnic party does not depend on variables like polarization or economic competition but the change in that support does.

Second, the above estimation uses short differences, from one election to the next, rather than long differences, over the course of a few elections. Small differences allow these results to be tied to big political developments such as the affirmative action policy or the demolition of the mosque and

hence give more insight into the success of ethnic parties. Any results obtained using a longer difference would likely be confounded by subsequent political and economic changes rather than just the effect of a mobilization strategy like the mosque case or the reservations.

4.4 Data and variables

The chapter uses data from three states of Northern India, Bihar, Haryana and Uttar Pradesh. The data are taken from various sources. The election data are from the Election Commission of India election reports from 1989, 1991 and 1996. The demographic data are taken from the 1931 and the 1991 censuses of India. The district level consumption data are taken from the NSS 43rd round in 1987. The unit of analysis used in the chapter is the parliamentary constituency, which is the level at which the political data is obtained. However, the economic and demographic data is obtained from the census at the district level, which is an administrative division and not a political one and the two boundaries often do not coincide. Thus to carry out the analysis I construct demographic/economic data at the constituency level using by mapping political constituencies back to administrative districts using delimitation reports from the election commission. These reports detail the extent of constituencies in terms of administrative divisions.

To directly assess the impact of the reservation policy on the political changes I constructed the proportion of OBC shares in each district. The Indian census does not collect information on OBC caste affiliation and the earliest NSS round which has district wise OBC information is 2001. So for this chapter I constructed OBC shares using the detailed caste census of 1931. I used list of OBC castes published by the National Backward classes commission (available at <http://ncbc.nic.in/Centrallistifobc.html>) and matched castes in the list to those in the 1931 census⁶⁶. There is disagreement among Indian scholars about what the real share of OBCs in the Indian population is. The Mandal commission pegged the figure at 54.4% while the NSS 2001 round puts the figure at 36.8%. My constructed share for the three states is very close to the NSS estimates. I only use those castes which were listed as OBC in the first round of reservations and not those which were added later.

The polarization index is constructed following Montalvo and Reynal-Querol (2005b) as $4 \sum \pi_i^2 (1 - \pi_i)$. Where π_i is the population share of group i in the population. I treat each religious and aggregate hindu caste group

⁶⁶Incidentally the Mandal commission also used the 1931 census for this purpose

as a separate group (i.e I use SC, OBC and other Hindu castes as distinct groups). Thus in a constituency if 70% of the population is hindu and 30% muslim and of the hindus half are high caste and half low caste then the population proportions are $\pi_{high} = .35, \pi_{low} = 0.35, \pi_{muslim} = 0.3$ giving the value of polarization as 0.89. The index is maximized when there are two equal sized groups in the population achieving a value of 1.

The demographic data used to construct the index are taken from the 1991 census. As a robustness check I also construct the polarization index using disaggregated caste data. To construct proportions of various Hindu castes, I use the detailed caste data from the 1931 census and update these 1931 caste proportions using the population of Hindus in 1991.

This index essentially measures the deviation of the demographic distribution from a bimodal distribution. A more general version of this index is found in Esteban and Ray (2008). $P(\sigma, \mathbf{b}) = \sum_i \sum_{j \neq i} n_i^{1+\sigma} n_j b_{ij}$ where i, j index demographic groups and n_i is the population share of group i . \mathbf{b} is the matrix of intergroup distances and σ is a positive parameter that captures the extent of group identification. The index used in this chapter is obtained from this general index by setting both b and σ equal to 1. This is the case when individuals in each group feel equally alien towards all groups other than their own and all individuals belonging to all groups identify equally strongly towards their own group. Table 1 reports the summary statistics for the variables used in the study.

4.5 Results and discussion

Motivated by the discussion in a previous section, to test the theory that ethnic polarization was in part responsible for the increased ethnicization in Indian politics I analyze the electoral performance of the major political parties, the BJP, BSP and the Congress. This section reports the results and provides a discussion.

4.5.1 Analysis of BJP's electoral performance

The vote share of the BJP increased by 15.8 percentage points between 1989 and 1991 and by 2.8 percentage points between 1991 and 1996. Thus the bulk of the increase in the vote share of the BJP post 1989 came between 1989 and 1991. Table 4.2 presents the results of estimating eqn. 4.1 for BJP. The dependent variable is the vote share of the BJP in 1989 in columns (1) and (2), the *change* in BJP vote share from 1989 to 1991 elections in

columns (3) and (4) and the change in BJP vote share from 1991 to 1996 elections in columns (5) and (6).

The results in the first two columns show that the vote share of the BJP in the 1989 elections, before the extension of the affirmative action policy, is uncorrelated with polarization. The average vote share of the BJP in 1989 was 9.5% and had hovered around that for the past decades. However, as the next two columns show the change in the vote share from 1989 to 1991 is positively and statistically significantly correlated with polarization. The positive correlation between vote change and polarization is robust to the inclusion of a series of demographic and economic controls.

The signs on these controls are what one would expect from the discussion in political science about the nature of the BJP as a political party. It is a party with urban, upper and middle class voters as its chief constituency. Thus constituencies with a higher proportion of urban voters see a larger increase in the BJP vote share between 1989 and 1991 (as suggested by the positive coefficient). So do richer (higher proportion of people who own houses) and more educated constituencies. These positive relationship between polarization and increase in vote share is consistent with the BJP having the support of a small group of partisan voters until 1989, but the events in 1990 and the subsequent mobilization by the BJP along ethnic lines making a substantial group of voters change their voting behaviour. Thus ethnic mobilization of the upper and middle castes by the BJP proved a winning strategy.

The results are also numerically significant. The point estimates reported in cols (3) and (4) suggest that in a (hypothetical) district with an average level of polarization of 0.522, polarization would account for an increase in the BJP vote share of 9.2 to 12.5 p.p. Given that the average increase in the BJP vote share between 1989 to 1991 is about 16 p.p these results suggest that polarization can account for 57.5% to 78% of the BJP vote share increase between 1989 and 1991. Studies on ethnic conflict also use the demographic fractionalization index as a measure of social fragmentation. In col (5) I include both the polarization and fractionalization indices as regressors. The point estimate on polarization remains positive while that on fractionzalization is negative and significant. This suggests that conditional on polarization the effect of demographic fragmentation on the increase in BJP vote share is negative. This could be because groups in more fragmented districts are harder to organize. This result is similar to that obtained in studies of ethnic conflict (see Montalvo and Reynal-Querol (2005b)).

In columns (6) and (7) the dependent variable is the change in BJP vote

share from 1991 to 1996. The coefficient on polarization is smaller and not as robust as in columns (3) and (4). This is not surprising given that most of the increase in the BJP vote share occurred between 1989 to 1991. But these results also suggest that there is something special about the big swing of voters towards the BJP between the 1989 and 1991 elections. Previous discussion suggests that a possible candidate for this could be the resistance to the Mandal commission, which the BJP used to mobilize its voters. The next section provides some empirical evidence for that.

The effect of the reservation policy on BJP vote share

To directly estimate the impact of the reservation policy on the BJP vote share I construct the following variable

$$Reservation_{ij} = p_j - prop.OBC_{ij}$$

Here i indexes constituency and j indexes state. Thus the above variable records difference the between the state level quota of seats reserved for OBC and the OBC population living in that particular constituency. To take a numerical example consider two constituencies lying in a state with $p_j = 0.27$. In the first constituency, A , prop. OBC is 0.4 and in the other constituency, B , it is 0.5. Then the reservation variable has a lower value for constituency B (-0.23 vs $-.13$). An upper caste voter who is against reservations for OBC should be more fearful in constituency B and hence more easily mobilized. Hence the increase in BJP vote share should be higher in constituency B . Thus the expected point estimate is negative on $reservation_{ij}$.

One caveat here is that the construction of the variable in this way introduces a mechanical correlation between vote share increase and the reservation variable. If OBC voters never vote for the BJP then just mechanically the potential increase in BJP vote share in constituency B above is lower (because it has more OBC voters). This effect goes in the opposite direction than the one discussed above. The last two columns in the table present the result of a regression with the change in BJP vote share as the dependent variable and the reservation variable as constructed above. As expected the point estimate is negative but its not significant on its own. However it does become significant when I control for the proportion of upper castes in a constituency to partial out the mechanical correlation mentioned above.

Together these results suggest that the implementation of the affirmative action policy and upper caste opposition to it made these voters amenable to a mobilization strategy based on polarizing ethnic groups.

4.5.2 Analysis of BSP's electoral performance

In Table 4.3 I analyze the electoral performance of the low caste party BSP. As in the case of the BJP in the first two columns the dependent variable is the vote share of the BSP in the 1989 elections. Again there is no co-relation between polarization and the vote share of the party in the initial elections. As discussed in a previous section the bulk of the increase in the BSP vote share happened between the 1991 and 1996 elections. Columns (3) and (4) present the results with the *change* in BSP vote share between 1991 and 1996 as the dependent variable. As the point estimate in column (3) shows the increase in the BSP vote share in a district is positively correlated to the level of polarization in that district.

Column (4) presents a much more interesting result. The previous discussion suggests that the gains made by the BJP in the 1991 election might in part be responsible for triggering a further increase in ethnic politics, and the success of the BSP. I test this by adding the change in BJP vote share from 1989-91 ($\Delta BJP_{1989-91}$) as a regressor in the estimation along with polarization. The point estimates confirm that $\Delta BJP_{1989-91}$ in a district is indeed a strong predictor of future success of BSP as the point estimate is positive. In fact when $\Delta BJP_{1989-91}$ is added as a regressor polarization ceases to be a significant and robust predictor of BSP vote share change. This result is not surprising since the increase in BJP vote share in the previous election captures the polarized nature of the constituency. Hence when used in the regression along with polarization the lagged vote share turns out to be better predictor. Column (5) repeats the estimation with additional controls. One of these controls is the lagged vote share of the BSP ($\Delta BSP_{1989-91}$). Not surprisingly constituencies which witnessed a higher increase in the BSP vote share in 1989-91 witnessed a smaller increase in 1991-96. However inclusion of this control does not affect the significance of the point estimate on the lagged BJP vote share.

4.5.3 Analysis of Congress' electoral performance

The above results suggest that over the course of two election ethnic parties like the BJP and BSP gained. This raises the question: which party was losing vote share? The answer is the multi ethnic Congress party. By using the vote share of the Congress as the dependent variable in a similar regression as above I find that the Congress loses vote shares in both elections, 1989-1991 and 1991-96.

Table 4.4 presents these results. The vote share of the Congress de-

creased by about 10 percentage points from 1989-91 and 9 p.p in 1991-96. The dependent variable in the columns (1) and (2) is $\Delta INC_{1989-91}$, the change in congress vote share from 1989 to 1991 and similarly in the last two columns it is $\Delta INC_{1991-96}$. The results presented in the table are not surprising given the results on the performance of other parties presented above. Polarization in a district is negatively correlated to the change in the vote share of the Congress. The point estimates for polarization are very similar across both dependent variables and as discussed above so is the change in the vote share across the two election cycles. Thus the Congress lost by about the same amount in both elections, but the parties who gained were different. The BJP gained between 1989 and 91 and the BSP between 1991 and 96.

Thus these results taken together suggest that from 1989 to 1996, more polarized districts witnessed sharper declines in the vote share of the Congress and steeper increases in the vote shares of the ethnic parties, the BJP and BSP.

4.5.4 Additional results and robustness checks

The effect of TV adaptation of the *Ramayana*

As discussed previously the BJP used the demand for the demolition of the mosque and building of a temple in Ayodhya to ethnically mobilize upper and middle caste Hindus. These demands were not new. The BJP and its non electoral allies like the Vishwa Hindu Parishad (VHP) had been making these demands for temple in Ayodhya for a decade, albeit not as intensively.

In 1987 and 1988 Indian public television adapted and broadcast the Hindu epic *Ramayana* (the epic whose hero is the Hindu god *Rama*, whose mythical birthplace is Ayodhya where the BJP and its allies wanted to build a temple). Scholars have argued that this adaptation might have benefited the right wing Hindu movement. As (Corbridge and Harriss, 2000, p.113) says, “The movement was perhaps assisted by the adaptation of the *Ramayana* which was watched by millions on Indian public television in 1987 and 1988 - an adaptation which once more highlighted the significance of Ayodhya within Hindu cosmology, and which, to the delight of the BJP, served up a more martial vision of Hinduism than many Indians, and many more non-Indians had grown accustomed to.” (see also Hasan (1998)).

For the results of this paper this is worrisome because it could be that, partly, the polarization of the Hindu voters may have been aided and triggered by these TV adaptations instead of opposition to the reservation poli-

cies. To discount this I control for the density of televisions in a district (proportion of population who own a television). In the results reported in Cols (4) and (5) in table 4.2, density of televisions is added as an additional control. The estimates on polarization are robust to the inclusion of this control.

Effect of polarization on vote share changes in other time periods

This paper argues that the implementation of the Mandal commission allowed the BJP to mobilize Hindu voters using an ethnic rhetoric. This emergence of upper and middle caste voters as a consolidated political group further polarized politics and the lower caste voters also shifted their support for ethnic parties. Thus the time period between 1989 and 1996 is special in that during that time concerns about reservations triggered a polarization of politics.

To see if this is indeed the case I look at vote share changes of these same parties over other elections. As I have already shown the vote shares of these parties in 1989 are not related to polarization. In table 4.5 I provide some additional results to this effect. I construct dependent variables of the sort $PARTY_{1998-1996}$, where $PARTY \in \{BJP, BSP, INC\}$, which is the change in vote share of that political party between the 1996 and 1998 elections. Cols (1) - (3) report these results for the BJP, BSP and Congress respectively. As can be seen from the point estimates polarization is not a significant explanatory variable for the changes in the vote shares of any of these parties (of course the unconditional changes are also smaller over this period as we saw earlier).

Alternative construction of the polarization variable

A lot of papers in the conflict literature use simpler measures of polarization, rather than the polarization index. For example (Collier (2001)) uses a dummy if the dominant ethnic group constitutes between 45% and 90% of the population. In a similar spirit I construct two alternative variables to the polarization index. First I construct the proportion of upper and middle castes in that district and secondly I construct the sum of Muslims and lower castes in the district.

Cols (4) and (5) of Table 4.5 present the results of using these variables as explanatory variables. The dependent variable is the change in BJP vote share between 1989 and 1991. Proportion of upper castes enters with a significant negative coefficient. Constituencies with higher proportion of upper

castes see a relatively smaller increase in BJP vote share. This supports the polarization story, an upper caste voter feels less threatened in constituencies with more upper castes and hence is more difficult to mobilize ethnically. On the other hand an upper caste voter living in a constituency with a higher proportion of the competing groups such as Muslims and low castes should be easier to mobilize and hence increase in vote share of BJP should be higher in constituencies with more Muslims and low castes. Col (5) confirms this. Proportion others enters with a positive and significant coefficient.

Finally I construct the polarization index using alternative data. The polarization index used in all of the previous regressions is constructed over religious and *aggregate* Hindu caste groups (SC, OBC and others). I also construct a polarization index using disaggregated Hindu caste groups i.e with subdivisions of the broad groups mentioned above. I obtain these proportions from the 1931 census of India and I update them using the Hindu population in the district from the 1991 census. Col (6) reports the results of using this alternative measure. The point estimate on this alternatively constructed polarization index ($Polarization_{1931}$) is significant and in fact very similar to the one obtained using the measure of polarization constructed using aggregate data.

4.6 Conclusion

This chapter attempts to provide an answer to the question: why do voters vote along ethnic lines? It does so by looking at the political developments in India dating from two decades ago. The results suggest the importance of competition (perceived or otherwise) for the control of state machinery between different ethnic groups. Ethnic polarization is positively correlated with the change in the vote share of the two ethnic parties, the BJP and the BSP and negatively correlated with the change in the vote share of the multi-ethnic party, the Congress. The results also suggest that the extension of affirmative action policies to cover a larger proportion of the Indian population triggered the use of ethnic mobilization strategies and that these electoral strategies succeeded.

The contribution of this chapter is two fold. First it is an attempt to fill a gap in the literature on ethnic voting, namely a lack of systematic empirical studies on the reasons for ethnic voting. There is no dearth of work that provides theoretical understanding of why voters might vote along ethnic lines, but most of our present understanding is based on evidence evinced

from case studies. This chapter presents empirical evidence for at least one variable that is important in explaining ethnic voting: polarization.

Secondly, a lot of the recent work in political economy looks at ways of reducing the incidence of ethnic voting (see Banerjee and Pande (2009), Banerjee et al. (2010), Casey (2010)) as ethnic identification in politics can reduce the efficacy of the political system in choosing the right candidates or disciplining politicians. The focus of a lot of this work has been providing information to uninformed voters about the performance of candidates, or candidate quality etc. The results in this chapter suggest that an alternative way to achieve this would be to reduce ability of politicians to target patronage.

The electoral success of the BJP and the BSP has generated a lot of academic interest and literature in political science (see for example Chhibber (2001), Corbridge and Harriss (2000), Hasan (1998), Hardgrave and Kochanek (2008)). However as distinct from this literature the present chapter has a much sharper focus. I am interested in understanding the role played by ethnic polarization in generating support for ethnic parties. Thus this paper complements the above literature by providing empirical support to some of the ideas discussed in this literature. However I believe that it also generates some insights not really discussed in the literature. I demonstrate that there is indeed a tight link between the electoral success of the BJP and the BSP. And that the electoral success of both these parties can be viewed as the result of a polarization of voters belonging to different groups and a move away from the multi-ethnic Congress party.

4.6. Conclusion

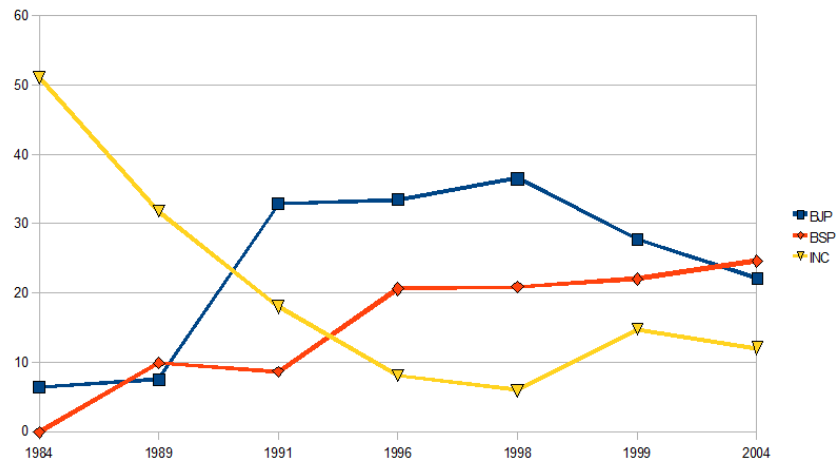


Figure 4.1: Vote shares of parties in national elections

4.6. Conclusion

Table 4.1: Summary statistics

Variable	Mean	Std.Dev.	Min	Max
BJP vote share 1989	0.095	0.153	0.000	0.605
BJP vote share 1991	0.253	0.137	0.000	0.509
BJP vote share 1996	0.282	0.157	0.000	0.573
$\Delta BJP_{1989-91}$	0.159	0.189	-0.483	0.509
$\Delta BJP_{1991-96}$	0.029	0.136	-0.341	0.487
Congress vote share 1989	0.315	0.094	0.000	0.674
Congress vote share 1991	0.207	0.116	0.000	0.532
Congress vote share 1996	0.110	0.112	0.006	0.527
$\Delta INC_{1989-91}$	-0.107	0.108	-0.357	0.231
$\Delta INC_{1991-96}$	-0.098	0.117	-0.391	0.333
BSP vote share 1989	0.058	0.083	0.000	0.380
BSP vote share 1991	0.051	0.073	0.000	0.313
BSP vote share 1996	0.125	0.115	0.000	0.382
$\Delta BSP_{1989-91}$	-0.007	0.056	-0.225	0.313
$\Delta BSP_{1991-96}$	0.074	0.084	-0.077	0.329
Polarization	0.522	0.207	0.036	0.982
Prop. Hindus	0.825	0.100	0.480	0.991
Prop. Muslim	0.154	0.095	0.004	0.479
Prop SC	0.187	0.057	0.049	0.325
Prop. Urban	0.177	0.112	0.045	0.627
Prop. own house	0.125	0.021	0.066	0.186
Prop. literate	0.330	0.078	0.195	0.552
Prop. graduate	0.021	0.011	0.008	0.078
Prop. diploma	0.021	0.011	0.008	0.080
Pop growth	0.247	0.063	-0.036	0.651
Urbanization growth	0.378	0.187	0.022	2.040
Growth in house ownership	0.030	0.170	-0.473	0.312
Growth in higher education	1.329	0.440	0.394	2.392
Growth in literacy	0.509	0.105	0.110	0.893

Notes: $\Delta Party_{t+1-t}$ is the change in the vote share of *Party* from year t to $t + 1$, where $Party \in \{BJP, BSP, Congress\}$. Growth rates are calculated as $(var_{1991} - var_{1981})/var_{1981}$ where var is the relevant variable. All proportions are calculated with respect to total population.

	1989 vote share		Vote share change 1989-91		Vote share change 1991-96		Vote share change 1989-91		
Polarization	-.002 (.055)	-.082 (.108)	.241 (.075)***	.176 (.106)*	1.207 (.304)***	-.100 (.052)*	-.006 (.074)		
Fractionalization					-1.791 (.430)***				
Reservation							-.156 (.143)	-.185 (.110)*	
Prop upper caste								-.609 (.213)***	
Prop urban		.330 (.365)		.855 (.337)**	.837 (.369)**		-.362 (.272)	.553 (.359)	
Prop own house		-.212 (1.041)		3.201 (1.103)***	3.834 (1.212)***		-.998 (.986)	2.348 (1.195)**	
Prop literate		-.280 (.396)		.510 (.444)	.834 (.434)*		.254 (.303)	.465 (.401)	
Prop with diploma		2.221 (19.345)		-35.600 (17.896)**	-38.944 (17.525)**		6.408 (12.696)	-43.318 (20.374)**	
Prop graduate		-4.138 (18.529)		31.968 (16.933)*	35.836 (16.234)**		-4.958 (12.497)	41.523 (19.183)**	
Density of TV				1.457 (1.933)	1.786 (1.639)				
Constant	.096 (.031)***	.236 (.176)	.033 (.041)	-.553 (.208)***	-.798 (.214)***	.081 (.032)**	.102 (.163)	.171 (.021)***	.087 (.239)
Obs.	149	149	149	149	149	149	149	149	
R-squared	.0008	.018	.069	.155	.202	.023	.049	.008	.198

Notes: Standard errors reported in the parentheses are heteroskedasticity robust. *, **, *** denote significance at 10%, 5% and 1% levels respectively. The data include all observations for the states of Uttar Pradesh, Bihar and Haryana. Polarization is the Reynol Querol (2005) index of polarization constructed over religious (Muslim, Christian and Sikhs) and subdivisions of Hindus (using caste groups).

4.6. Conclusion

Table 4.3: Electoral outcomes for BSP
Vote share 1989 Vote share change 1991-96 Vote share change 1989-91

	Vote share 1989		Vote share change 1991-96		Vote share change 1989-91	
Polarization	.201 (.135)	.033 (.171)	.193 (.089)**	-.043 (.141)	.127 (.177)	.191 (.080)**
$\Delta BJP_{1989-91}$.090 (.031)***	.067 (.029)**	-.034 (.019)*
$\Delta BSP_{1989-91}$				-.285 (.122)**	-.323 (.119)***	
Prop urban		-.114 (.101)			.545 (.161)***	-.050 (.073)
Prop own house		.117 (.338)			.423 (.318)	.276 (.279)
Prop literate		.237 (.171)			.246 (.173)	.198 (.129)
Prop diploma		-6.251 (6.720)			-15.975 (6.481)**	-3.446 (4.913)
Prop graduate		6.296 (6.238)			11.277 (5.955)*	3.775 (4.491)
Constant	-.079 (.093)	-.337 (.079)***	-.057 (.062)	-.187 (.046)***	-.313 (.081)***	-.131 (.054)**
Obs.	149	149	149	149	149	149
R squared	.038	.295	.034	.301	.417	.133

Notes: Standard errors reported in the parentheses are heteroskedasticity robust. *, **, *** denote significance at 10%, 5% and 1% levels respectively. The data include all observations for the states of Uttar Pradesh, Bihar and Haryana. Polarization is the Reynol Querol (2005) index of polarization constructed over religious and Hindu caste groups. $\Delta BJP_{1989-91}$ is the change in the vote share of the BJP between the 1989 and 1991 elections. Similarly $\Delta BSP_{1989-91}$ is the change in the vote share of the BSP between the 1989 and 1991 elections.

4.6. Conclusion

Table 4.4: Electoral outcomes for the *Congress*

	Vote share change 1989-91		Vote share change 1991-96	
Polarization	-.215 (.129)*	-.335 (.163)**	-.299 (.138)**	-.421 (.190)**
Prop Urban		-.309 (.225)		.319 (.228)
Prop own house		-1.206 (.657)*		.493 (.684)
Prop literate		-.161 (.270)		-.138 (.295)
Prop diploma		6.055 (9.766)		-9.899 (9.121)
Prop graduate		-5.021 (9.656)		8.331 (8.875)
Constant	-.064 (.025)**	.164 (.125)	-.147 (.026)***	-.140 (.136)
Obs.	149	149	149	149
R-squared	.024	.058	.069	.088

Notes: Standard errors reported in the parentheses are heteroskedasticity robust. *, **, *** denote significance at 10%, 5% and 1% levels respectively. The data include all observations for the states of Uttar Pradesh, Bihar and Haryana. *Polarization* is the Reynol Querol (2005) index of polarization constructed over religious and aggregate Hindu caste groups.

Table 4.5: Additional results

	BJP vote share change 96-98	BSP vote share change 96-98	INC vote share change 96-98	BJP vote share change 89-91	BSP vote share change 91-96
Polarization	-.149 (.163)	-.065 (.050)	.080 (.073)		
Prop upper caste				-.671 (.209)***	
Prop Others				.780 (.153)***	
Polarization ₁₉₃₁					.288 (.076)***
Constant	-.265 (.104)**	.096 (.056)*	-.313 (.121)***	.035 (.250)	-.823 (.207)***
Obs.	149	149	149	149	149
R-squared	.14	.08	.075	.191	.239

Notes: Standard errors reported in the parentheses are heteroskedasticity robust. *, **, *** denote significance at 10%, 5% and 1% levels respectively. The data include all observations for the states of Uttar Pradesh, Bihar and Haryana. *Polarization* is the Reynol Querol (2005) index of polarization constructed over religious and aggregate Hindu caste groups (SC, OBC and others). *Polarization*₁₉₃₁ is a similar RQ index constructed using religious groups and disaggregated Hindu caste groups taken from the 1931 census of India. *Prop upper caste* is the proportion of Hindu population belonging to the upper and middle castes in the constituency while *Prop Others* is the sum of Muslim and lower caste population proportions. Controls include proportion of urban population in district, proportion of population who own a house, proportion of population who are literate, proportion who have a diploma and proportion of population who are college graduates.

Chapter 5

Conclusion

The chapters in this thesis have studied some important political developments in India in the recent past and have provided evidence for the role of economic changes in furthering these developments.

Chapter two shows that the adoption of new technology under the green revolution brought disparate group of rural voters together behind one party, the *Bhartiya Lok Dal* (BLD), and played a vital role in its success. By increasing the level of commercialization in Indian agriculture it reduced the heterogeneity in the preferences of different group of voters allowing them to consolidate. It also provides evidence to show that the success of the BLD also led to policy changes and changes in public good provision. But whereas chapter two shows that economic imperatives can allow voters to overcome their ethnic divisions, the results in chapter four paint a rather grim picture.

Under a different set of circumstances, increasing economic competition between groups and lack of politically strong multi-ethnic or non ethnic parties, voters can organize behind parties organized along ethnic lines rather than policy. The chapter shows that ethnic polarization explains in part the success of the *Bhartiya Janata Party* (BJP) and *Bahujan Samaj Party* (BSP) and moreover the success of the BJP between 1989 and 1991 in a district positively predicts the increase in BSP vote share between 1991 and 1996.

I believe that in the light of the results of chapter four those in chapter two assume even more importance. Recent papers in the literature have conceptualized and documented evidence on how ethnic diversity between majority group of voters in poor democracies can hurt their cause by allowing the minority to govern (Bandiera and Levy (2010)). The evidence presented in the second chapter shows that in the Indian context it has been possible to overcome these divisions with the ‘right kind’ of economic change.

Chapter three shows that caste disparities in India exist not only in direct economic outcomes but also in indirect ones. The role of social networks and people of influence in that social network in dealing with corruption puts low castes in an adverse situation, exposing them more to corrupt

officials. However as the chapter documents, the rise of the BSP and the accompanying low caste mobilization have had indirect benefits for low caste people. The combination of reservations at local government level and BSP mobilization result in an increase in the strength of the low caste political network and consequent reduction in the bribes paid by them.

The results of chapter two suggest that a fruitful avenue for future research would be to build a theoretical model with voters valuing both ethnic identification and policy preferences in their voting decision. This could be used to study how a change, such as the green revolution, that makes policy preferences more important would affect the political equilibrium. This would not only provide a conceptual framework to understand the results of this chapter but also provide insight into other situations of a similar nature.

The data used in chapter four is from 1989-96. During this period India systematically deregulated its economy. It would be very interesting to see how the economic changes resulting from this deregulation affected the performance of ethnic parties. Did these changes interact with underlying ethnic polarization in districts and exacerbate it? Or is polarization a proxy for these fundamental economic changes and once these are accounted for it would no longer be a significant predictor of ethnic voting.

The results in chapter four provide evidence for a link between polarization and electoral outcomes. A formal investigation of this link presents a fruitful avenue for future research as it will not only help interpret the results of this chapter better but also provide a general understanding on the nature of the electoral process in ethnically divided democracies such as India.

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