American Economic Journal: Applied Economics 2012, 4(3): 43–63
http://dx.doi.org/10.1257/app.4.3.43

Sweetening the Deal? Political Connections and Sugar Mills in India[†]

By Sandip Sukhtankar*

Political control of firms is prevalent across the world. Evidence suggests that firms profit from political connections, and politicians derive benefit from control over firms. This paper investigates an alternative mechanism through which politicians may benefit electorally from connected firms, examining sugar mills in India. I find evidence of embezzlement in politically controlled mills during election years, reflected in lower prices paid to farmers for cane. This result complements the literature on political cycles by demonstrating how campaign funds are raised rather than used. Politicians may recompense farmers upon getting elected, possibly explaining how they can get away with pilferage. (*JEL* D72, G34, L66, O13, O17, Q12, Q13)

Links between politicians and firms are prevalent across the world. Faccio (2006), for example, documents political connections in over 74 percent of the countries in her sample.[1] Economists have suggested two potential consequences of these links. First, *firms* may benefit from political connections, for example, through politically channeled loans and contracts, regulatory benefits, and soft budget constraints. A multitude of evidence supports this contention.[2] Second, *politicians* may extract benefits from firms. For example, Shleifer and Vishny (1994) predict theoretically that firms expand employment to garner votes

*Dartmouth College, Department of Economics, 6106 Rockefeller Center, Hanover, NH 03755 (e-mail: sandip.sukhtankar@dartmouth.edu). I am especially grateful to Sendhil Mullainathan, Rohini Pande, and Andrei Shleifer for their guidance and comments; and to Ryan Bubb, Shawn Cole, Sanghamitra Das, Eric Edmonds, Sandy Jencks, Michael Kremer, Gabi Kruks-Wisner, Jean Lee, Erzo Luttmer, Dilip Mookherjee, Kirk Moore, Paul Niehaus, Sampatrao Sabale, Matthias Schündeln, Doug Staiger, and seminar participants at Harvard University, Massachusetts Institute of Technology, NEUDC 2008, NBER Student Political Economics Conference 2008, Dartmouth College, New York University, Wesleyan University, Wellesley College, Boston College, University of Wisconsin-Madison, and IFPRI for helpful discussions and comments. I thank the Maharashtra Sahakari Sakar Karkhana Sangh and Kaivan Munshi for providing data on sugarcane prices; Dr. Rajeev Sukhtankar, Mr. Vilas Thosar, Ms. Sneha Deo, and librarians at the Vasantdada Sugar Institute for help acquiring the rest of the mill data; and Scott Walker at the Harvard Map Collection for assistance with GIS data. Jung Kim and Edward Lescher provided excellent research assistance. Financial support provided by the Harvard University Multidisciplinary Program in Inequality & Social Policy (National Science Foundation IGERT grant 0333403) and a Harvard Economics Department Simon Kuznets Travel Award is gratefully acknowledged.

[†] To comment on this article in the online discussion forum, or to view additional materials, visit the article page at http://dx.doi.org/10.1257/app.4.3.43.

[1] Specific examples from individual studies abound. Khwaja and Mian (2005) find that 23 percent of firms that received corporate loans in Pakistan had a politician sitting on their board. Fisman (2001) finds that 38 percent of firms on the Jakarta stock exchange were closely connected to President Suharto. Faccio (2006) finds that 87 percent of market capitalization in Russia is in politically connected firms.

[2] A long tradition in economics starting with Stigler (1971) examines regulatory capture by politicians. Recent empirical evidence on the different channels is provided by Fisman (2001); Khwaja and Mian (2005); Dinc (2005); Jayachandran (2006); Faccio, Masulis, and McConnell (2006); Faccio (2010).

for connected politicians; and Bertrand et al. (2006), Cole (2009), and Dinc (2005) explore this channel empirically.

This paper explores an alternative mechanism through which politicians may benefit from connected firms, namely by extracting resources for political campaigns. Focusing on sugar mills in Maharashtra, India, I investigate how mill outcomes are affected by mill chairmen (chief executives elected by farmer-shareholders) seeking external political office. In particular, I test whether electoral cycles in input prices paid for sugarcane are concentrated in politically controlled mills. The analysis thus also relates directly to the literature on political cycles—economic activity that is correlated with election cycles (Alesina and Roubini 1997; Shi and Svensson 2003).

The context of sugar mills offers several attractive features. First, political connections are widespread and identifiable. Of 183 mills for which data are available, 101 had current chairmen who competed for state or national elections between 1993–2005. Second, almost all mills are grower cooperatives, and, hence, profits/losses are distributed to farmer-shareholders via input prices paid for sugarcane. Finally, the simple technology of sugar production makes it possible to empirically separate whether distortions in profits stem from changes in productivity or from simple theft. The empirical analysis relies on a hand-constructed panel dataset, which identifies politically controlled mills by matching mill chairmen names to those of electoral candidates, thus allowing a comparison of election-year outcomes in politically controlled and nonpolitically controlled mills.

I find that cane prices that each mill pays its farmers fall in politically controlled mills in election years. The price drops are significant from the farmer's perspective, representing about 20 percent of annual variation in a typical mill's prices, and translate to economically significant plunges in revenues of around Rs 6 million ($135,000) per election year, per mill. The drops are robust to specifying prices in logs rather than levels and to dropping particular elections where treatment effects may not be expected, and may be higher in magnitude during close elections (this result is not significant in all specifications). A variety of results suggests that these drops are not (at least entirely) due to a loss of productivity stemming from election-related interference in mill functioning, although a conclusive case cannot be made.

I argue that drops in price represent mill funds siphoned off to finance politicians' electoral campaigns, an argument that reinforces previous claims of price distortions. Sridharan (1999) suggests that campaign funds in India are regularly raised by "manipulation of administered prices on commodities like sugarcane." Banerjee et al. (2001) show that suppression of cane prices is a mechanism for extracting rents from sugar mills in Maharashtra. My evidence suggests that this mechanism is particularly relevant in election years. In developing countries with low official campaign finance limits and imperfect oversight, illicit campaign financing and spending is of much higher magnitude and importance than legal flows (Gingerich 2010). In the sugar mills case, the magnitude of the drops in revenue is roughly comparable to the funds required to contest elections according to a number of sources (Ganesan 1997; Aiyar 2000; Sridharan 2006).

These results complement the literature on political connections, which emphasizes benefits rather than costs to connected firms. In addition, the previous

literature on political cycles has focused on short-term gifts rather than taxes on voters in election years, or how election campaign funds are spent rather than raised.[3] Theories of tactical redistribution suggest that politicians will target resources to maximize their electoral success (Wright 1974; Dixit and Londregan 1996; Grossman and Helpman 1996; Snyder 1989). Cole (2009) and Dahlberg and Johansson (2002), for example, find that incumbent governments allocate finances to constituencies with close elections and swing voters. This theory and supporting evidence suggest that the Shleifer and Vishny (1993) prediction that politicians pressure firms to expand employment will hold under certain conditions; namely, that a dollar spent on the firm's employee increases the probability that she votes for the politician more than a dollar spent on someone else. Under different conditions, however, the optimal campaign strategy might involve taxing the firm and redistributing toward other voters if the employees' elasticity of voting with respect to transfers is relatively low, and/or the employees comprise a small, yet rich, proportion of the voting population.

Further examination reveals that both these conditions might be true in the context of sugarcane farmers in Maharashtra. Sugarcane farmers are relatively rich compared to the average voter in rural areas (Mullainathan and Sukhtankar 2011), and also comprise a small proportion of the voting population in national election constituencies.[4] Farmers may also be constrained by the institutional arrangement, since they cannot sell sugarcane to mills far away, and government interference in sugar markets means they enjoy rents that preclude them from shifting to other crops. This account, however, does not explain why farmers continue electing these politicians to chair their mills. Most observers acknowledge that internal mill elections are keenly contested, and chairmen who pay low cane prices are likely to be punished (Attwood 1992; Baviskar 1980). Why then might sugarcane farmers' votes be inelastic with respect to low prices in election years? One possible explanation is that politicians channel funds back to mills once they get elected. I examine mill payments of cane prices when chairmen succeed in elections and find that chairmen who win national elections pay farmers higher cane prices in the year after elections.[5] When the chairman's political party controls the state government, the mill also pays higher cane prices. While these results are merely suggestive, perhaps, from the farmer's perspective, price drops are not theft by politicians, but indirect campaign contributions for which they receive compensation later.

While a large and long standing body of literature studies benefits to firms from political connections, economists have only recently turned their attention to the rents that politicians may extract from firms. Most analyses of political connections have relied on event studies to show the benefits of political connections. This paper suggests that a longer time horizon may be necessary to capture the costs associated with periods when politicians require financing for their own aims. Analyses of political cycles have generally focused on incumbent politicians who have access to

[3] A notable exception is a recent working paper by Kapur and Vaishnav (2011), which finds drops in cement consumption just prior to election months, and argues that the drops are a result of construction company contributions to election campaigns.

[4] In addition, the poor in India are more likely to vote than the rich (Yadav 2002; Mitra and Singh 1999).

[5] Note that this is not merely a bounce back to average prices, but to higher than average prices.

government-controlled policy instruments, such as fiscal policy, grants from central to state governments, or credit policy. My study, in contrast, documents political cycles caused by politicians and mechanisms outside government. A separate literature on political redistribution examines conditions under which politicians reward their supporters (patronage) or woo swing voters (strategic allocation) (Wright 1974; Dixit and Londregan 1996; Grossman and Helpman 1996). My evidence suggests that politicians extract rents from their supporters during elections, but perhaps reward these supporters after winning elections. Finally, the paper adds to a small but growing literature on illicit campaign finance, empirical studies on which are limited because of the difficulties in obtaining data (Gingerich 2010; Kapur and Vaishnav 2011).

The rest of the paper is organized as follows. Section I provides background on sugar mills and politics in Maharashtra, and explains the sugar production process. Section II describes the data and the empirical strategy. Section III presents the results and robustness checks. Section IV interprets these results and presents empirical tests and results on whether politicians pay back farmers. Section V concludes.

I. Sugar and Politics in Maharashtra

Sugar production is an extremely important sector in Maharashtra, with 45 percent of the state's rural population dependant on the sector for their livelihood.[6] Sugarcane is the primary cash crop in the state, taking up 24 percent of all irrigated land (Agricultural Census of India 2001). The vast majority of sugar mills in Maharashtra are grower cooperatives. Political control has been a characteristic feature since the first cooperative sugar mill in the state was established in the 1950s. I describe the industry structure in greater detail below.

A. *The Sugar Industry and Cooperatives*

There are currently 185 sugar mills in operation in Maharashtra, of which over 90 percent are cooperatives.[7] In a cooperative mill, farmers obtain shares proportional to the amount of land they own. A share entitles a farmer to sell a specified amount of cane to the mill, and obliges the mill to buy that amount of cane. The price paid to farmers for supplying the cane is a direct indicator of mill profits and losses, as all residual claims are adjusted using the final price paid per ton of cane.

State and national governments heavily regulate the sugar industry. Public funds are used to set up mills, provide bailouts when mills face threats of bankruptcy and provide subsidized loans for operation. Sugar mills have monopsony power under the "command area" or zoning system, whereby farmers who have land in a particular area can only sell cane to the assigned mill in that region, and the mill can only

[6] Source for dependent population figure: http://www.maharashtra.gov.in/english/chiefminister/cm_cooperative_sugar_factories.pdf.

[7] The few private mills are similar to cooperatives, and there is no reason to presume that they are free of political pressures or connections. For example, Lokmangal Agro Industries, a private mill in Solapur district, is controlled by Subhash Deshmukh, the current member of Parliament from North Solapur.

buy cane from the farmers in its command area.[8] Cane price floors are set by state and national governments. These usually do not bind in Maharashtra.

A typical cooperative consists of about 20,000 farmer-shareholders. The conventional governance structure of a cooperative consists of a chairman, vice-chairman, secretary, treasurer, and a board of directors, all of whom are elected every four or five years.[9] In these elections, each shareholder is entitled to a single vote, regardless of the number of shares she owns. Cooperative elections allow politicians to gain control over the mill. On the other hand, these internal elections might also be a constraint on rent extraction, since most observers agree that elections for the executive positions are intensely contested (Attwood 1992; Baviskar 1980). The price of cane paid is a very important factor in these elections. Attwood (1992, 200) remarks:

> *The primary economic goal of the directors is to pay the highest possible cane price to the growers. Cooperative chairmen and directors also have strong political goals. They use their local influence to compete in state politics, and many have become Members of the Legislative Assembly (MLAs) or Members of Parliament (MPs). Consequently, there is keen competition for election to the factory boards. In these elections, the directors are judged, among other things, by how well the members have been paid for their sugarcane.*

B. *Politicians, Elections, and Control of Sugar Mills*

Political control of sugar mills is widespread in Maharashtra. For example, the previous two Chief Ministers of Maharashtra, the current Agriculture Minister of India, and even the President of India all directly or indirectly (through a family member or close relative) control a sugar mill in the state. In my data, in a typical election year almost half of state and national constituencies that contain sugar mills have at least one contesting candidate who is a current chairman of a sugar mill (Figure 1). These chairman-candidates are the basis of my definition of political control. I consider mills as being under political control when the current chairman is a politician, i.e., someone who has *ever* been a candidate in state or national elections over the sample period.

Chairman-candidates fall into two groups: large farmers and landlords who work their way up the mill hierarchy and enter politics as a consequence, and existing politicians who enter mill politics.[10] In order to contest elections, candidates usually need a ticket from a major party, although they can always contest as independents. Getting a party ticket can itself be very costly. While there are no internal primaries, lobbying for and often directly purchasing a major party ticket requires funds. The vast majority

[8] Although this system was supposedly dismantled in 1997, the new system does not allow new mills to open within a 15 km radius of an existing mill, which, when combined with the dependent relationship a cane farmer has with the mill to procure seed, fertilizer, credit, pesticide, etc., effectively binds the farmer to the existing mill. Such measures were meant to ensure that mills utilized their capacity, and to ensure that sugarcane could be crushed within 24 hours of it being cut, as it quickly loses its juice.

[9] Mechanisms for electing chairmen differ across mills. Some are elected directly, while others are chosen by the board from among its members. Moreover, some mills have rotating positions on the board every two years, whereas others even elect their chairmen every year.

[10] The citizen-candidate model of electoral politics (Besley and Coate 1997) seems to describe the process of political entry in both cases.

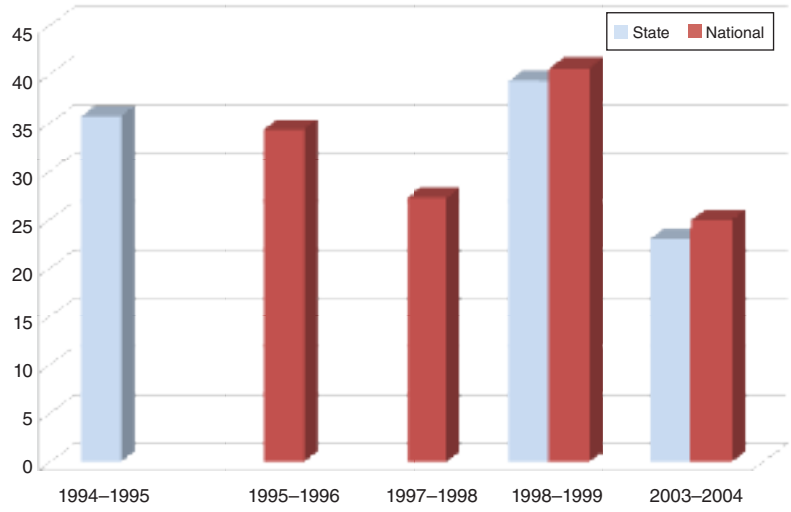

Figure 1. Proportion of Constituencies with Chairman Contesting External Elections

Notes: Plots the proportion of constituencies with sugar mills that witnessed a mill chairmen contest state or national elections during the period 1993–2005. There are 120 state constituencies and 33 national constituencies that contain sugar mills in Maharashtra.

of candidates contest on a major party ticket, with the Congress and the Nationalist Congress Party (NCP) being the parties with affiliations to most sugar mills, although the Bharatiya Janata Party (BJP) has also made some inroads in recent years.

Winning candidates in state constituencies are elected to the Maharashtra State Legislative Assembly, while winners in national constituencies serve in the National Parliament. The Indian Constitution mandates that elections to both state and national assemblies be held every five years. In practice, however, elections may be called early when a coalition government cannot maintain its majority. As a consequence, state and national elections are not necessarily concurrent. Once elected, legislators can access state resources via both licit and illicit means. By all accounts, politicians add to their personal wealth after winning elections (Ramesh 2008). However, contesting elections is costly. Funds are required for campaigning, bringing rural voters to the polls, and sometimes direct vote-buying.

The effects of political control of mills have been debated. Bunsha (2003) suggests "56 of Maharashtra's 163 sugar mills are bankrupt, ruined by corruption and nepotism. Second- and third-generation politicians have squeezed out all profits, leaving the state government to bail them out." In recent years, a number of bankrupt cooperatives have been taken over by private firms. On the other hand, Attwood (1992) writes positively about the performance of sugarcane cooperatives in the state, comparing them favorably to private mills in the state of Uttar Pradesh. Proponents often point to the example of Baramati, a dormant backwater cane growing region that now has a vibrant economy thanks to the patronage of the premier sugar mill politician and Union Agricultural Minister Sharad Pawar. These divergent views suggest that political connections of sugar mills can result in both costs and benefits to farmer-shareholders.

C. *Sugar Production Function*

Sugar production is a two-stage process. The first stage consists of planting and growing sugarcane, and harvesting and transporting it to the factory. Sugarcane is a water- and fertilizer-intensive crop that is harvested yearly. Once harvested, the stalk can regrow for another one to three harvests. The second stage involves extracting sugar from the cane at the factory. The harvested cane is crushed to extract sucrose-rich juice, which is boiled and refined using lime and sulphur to produce sugar crystals. The crushing season usually runs from November through April/May.

The sucrose and water content of sugarcane determines the potential amount of sugar that can be extracted from it, although a role is played by the efficiency and organization of the mill. Once cane is harvested, it must be crushed within 24 hours to prevent drying. Mills need to coordinate cane harvesting in order to run the factory at capacity every day. Machinery breakdowns are extremely costly, since the cane at the factory starts drying out, and the harvesting schedule must be adjusted.

The firm faces a capacity constraint in the maximum tonnage of cane that can be crushed per day using the installed machinery, as well as a constraint on the maximum amount of sugar that can be extracted from a given amount of cane. Output of sugar is roughly constant returns to scale in most inputs, and clearly linear in cane crushed.

D. *Mill Revenues and Cane Prices*

The chief source of revenue for mills is the sale of sugar. Mills can sell up to 90 percent of output on the open market. The rest must be sold to the government at reduced rates. Each mill pays its farmers a single price per metric ton of cane every year based on weight; i.e., mills cannot price discriminate on the basis of quality. Each farmer must be paid the same price per ton of cane. Sugarcane cooperatives are not legally allowed to retain profits, although they can accrue losses. Any excess of revenues over costs must be returned to farmers as higher prices for cane or invested in "public goods," such as schools and universities for farmers' children, roads, or irrigation networks. Hence, cane prices are generally good indicators for profits made by the mill, as also emphasized in Banerjee et al. (2001).

The recovery rate, sugar produced per unit cane, determines the overall revenues of the mill, while the cane price designates the division of revenues between farmers and mill cost and upkeep.[11] Recovery rates are strongly and positively correlated with prices. A drop in the recovery rate, hence, reduces the overall revenues available to pay cane prices, but does not necessarily mean that cane prices will go down, since mill leaders could defer or default on other costs, such as to transporters, interest costs, mill upkeep costs, etc.

[11] In this paper, all I observe are reported recovery rates.

II. Data and Empirical Strategy

A. *Data*

My analysis relies on a hand-constructed panel dataset consisting of: annual data on individual mill outcomes, inputs, and operations; annual data on state, national, and world sugar industry indicators; monthly rainfall; state and national election dates, candidates, and results; mill chairman names; and satellite images of sugar-growing regions. All data refer to the cane crushing season, that is November–May. For example, the year 1993 refers to the crushing season 1993–1994. All observations are at the level of a mill-year, given the yearly harvest of sugarcane. Since not all mills were in existence or operation in all years, the panel is unbalanced.[12] While data for most mill outcomes are available from 1969–2005, mill chairmen's names are available systematically only from 1993.[13] The online Appendix describes the data and sources in detail.

Table 1 provides descriptive statistics separately for politically connected and nonconnected mills. The first year that a cooperative operates is usually a "trial" year, when a very small quantity of cane is crushed and very low recovery rates are achieved. These years, data for which are only available for some mills, are excluded from regressions and the summary statistics. I also exclude "nonstarter" seasons, during which the mill is open for only a few days and almost no cane is crushed. These represent a clear discontinuity from the rest of the data. The data show that politically connected mills and those that are not politically connected are exactly alike on the recovery rate and cane price dimensions. The major difference between the two groups is that politically connected mills tend to be larger (average capacity of 2,629 tons crushed per day versus 2,139).

B. *Empirical Strategy*

Anecdotal evidence suggests that chairmen who are candidates in external elections use mill resources for contesting elections.[14] In order to examine the effects of direct connections between politicians and mills, I match mill chairmen's names to those of electoral candidates to identify chairmen who are politicians. To reduce errors in matching, I use only exact matches and consider electoral candidates only in and around the constituency that the sugar mill is located. I consider mills as being under political control when the current chairman is a politician, i.e., someone who has *ever* been a candidate in state or national elections over the sample period.

[12] Biases, if any, are more likely to arise from incidental truncation—some mills do not work or report their data in some years—as opposed to pure attrition, since very few mills shut down completely. I test whether the operational status itself is affected by political connections in order to determine whether the unbalanced nature of the panel biases the results.

[13] The National Federation of Cooperative Sugar Factories Yearbook started reporting mill chairmen's names from that year. In addition, there are 12 mills, mostly private, for whom no mill chairmen's names are available at any time. I drop these from my analysis.

[14] For example, Sirsikar (1995) says, "Every sugar cooperative factory has become the centre of rural economic and political power. The resources of the factory have also been used for welfare functions … but their main use is for securing political power."

TABLE 1—DESCRIPTIVE STATISTICS

	Average (1)	Not connected (2)	Connected (3)	*p*-value (4)	Units (5)
Cane price	929 (265)	929 (270)	929 262)	0.996	2004 Rupees
Recovery rate	10.96 (0.97)	10.96 (1.03)	10.96 (0.92)	0.969	%
Cane crushed	379,605 (246,800)	342,074 (234,100)	406,044 (252,172)	0.083	Metric tons
Sugar produced	427,511 (297,541)	387,583 (288,674)	455,639 (300,635)	0.136	Quintals
Cane planted	0.244 (0.232)	0.251 (0.247)	0.238 (0.22)	0.592	% available cropland
Actual days worked	139 (50.48)	135 (50.3)	141 (50.46)	0.137	days
Actual hours worked	3,038 (1,111)	2,953 (1,102)	3,098 (1,114)	0.127	hours
Hours lost to breakdowns	3.26 (3.6)	3.25 (3.8)	3.27 (3.45)	0.959	% of available hours
Hours lost to cane shortage	8.58 (11.96)	9.24 (12.16)	8.12 (11.81)	0.349	% of available hours
Lime added	0.156 (0.037)	0.156 (0.035)	0.156 (0.038)	0.975	Kilograms/ton cane
Sulphur added	0.049 (0.012)	0.050 (0.012)	0.049 (0.012)	0.252	Kilograms/ton cane
Capacity	2,416 (1,092)	2,139 (924)	2,629 (1,163)	0.002	Tons crushed/day
Mill closed	0.142 (0.349)	0.160 (0.367)	0.128 (0.334)	0.333	

Notes: The summary statistics do not include years that were "trial years," as these are also excluded from the analysis. Not all mills are in operation in all years. Hence, there are some data missing. There are 185 mills currently reported to exist in Maharashtra according to the Maharashtra State Sugar Cooperatives Federation. Of those mills, a maximum of 176 mills were in operation in 2002. The paper uses data on 195 current and old mills. "Cane price" is the annual price paid per ton of cane, deflated using the Consumer Price Index for agricultural workers in Maharashtra. "Recovery rate" is the total amount of "sugar produced" divided by the total weight of "cane crushed," times 100. "Cane planted" is the proportion of available crop land within a 15 km radius of the mill that has been planted with sugarcane. "Actual days (hours) worked" are the number of days (hours) that the mill actually operated that season. The "hours lost" variables refer to the percentage of working hours that the mill shut down due to machinery breakdowns or cane shortages during the time it was open in the season. "Lime added" and "sulphur added" are the amounts added to extracted juice in kilograms/ton. "Mill not in operation" is simply an indicator for whether the mill worked in the current season. Column 4 presents the *p*-value from a regression of the variable on an indicator for whether the mill is politically connected (with standard errors clustered by mill).

These narrow definitions do not include individuals running for elections who are not current chairmen but may still have strong connections to the mill, for example, through a relative or protegee, or executives who are in less powerful positions in the mill. However, this is the most objective way of considering political control given the constraints of the available data. A systematic analysis of candidates with indirect, albeit close, links with sugar mills would be difficult, since the connections do not necessarily involve the same family names.[15] My definitions of "politician"

[15] Sirsikar (1995), who conducted this analysis in 1995, found that over 80 members of the Maharashtra Legislative State were associated with sugar mills from about 120 constituencies with sugar mills. Compared to this figure, my measure is a more conservative count of political connections.

and "political control" are, hence, conservative. Any potential misclassification that is a result of these strict definitions would only attenuate results toward zero, despite the nonclassical measurement error (Aigner 1973).

Given these definitions, I can test whether politically controlled mills are particularly affected in election years during the period 1993–2005. "Election year" for this paper corresponds to the sugar year (Nov–Oct) during which election took place.[16] My strategy is to interact an indicator for political control (which varies both over time and across mills) with indicators for election years, while controlling for time-invariant, unobserved differences between mills via mill fixed effects δ_m, and for unobserved yearly shocks using year fixed effects τ_t. This difference-in-differences approach allows me to estimate

$$(1) \quad Y_{mt} = \alpha + \nu PC_{mt} + \beta(PC_{mt} \times Elec_t) + X'_{mt}\gamma + \delta_m + \tau_t + \epsilon_{mt},$$

where m indexes mills; t indexes years; Y_{mt} is a mill outcome, such as the recovery rate or the cane price; PC_{mt} is an indicator for current mill chairman being a politician; and $X_m t$ is a set of mill-level controls, such as rainfall, the squared deviation from mean rainfall, capacity,[17] and—in certain specifications—mill-specific outcomes, such as hours lost due to machinery breakdowns and cane shortages control for idiosyncratic shocks at the mill-year level that might affect outcomes. Since elections occur at the same time across mills, standard errors may be spatially correlated. I cluster by year × region, resulting in 39 clusters.[18] Errors may also be correlated within mills across years. Accordingly, standard errors are clustered along two dimensions, across time-region and mills, using the multi-way clustering approach suggested by Cameron, Gelbach, and Miller (2011) and Thompson (2011).

Finally, it is possible that effects are particularly strong during close election years (close election is defined as one where the winning margin was less than 5 percent of cast votes). To test this hypothesis, I first estimate

$$(2) \quad Y_{mt} = \alpha + \nu PC_{mt} + \omega CloseElec_{mt} + \beta(PC_{mt} \times CloseElec_{mt}) + X'_{mt}\gamma + \delta_m + \tau_t + \epsilon_{mt}.$$

[16] National elections took place in May 1996 (sugar year 1995–1996), February 1998 (1997–1998), September–October 1999 (1998–1999), and April–May 2004 (2003–2004). State elections took place in March 1995 (1994–1995), September 1999 (1998–1999), and October 2004 (2003–2004). Since there is only one state election that took place in a year that did not also have a national election, I do not show separate results for state elections.

[17] Capacity changes are infrequent, take a long time to implement, and outside the realm of what an individual chairman could achieve in one year, hence, not considered endogenous in this context. A regression of capacity as the outcome in equation (1) shows no effect on the political chairman × election year interaction.

[18] Maharashtra is twice the size of Germany in terms of land area, and has three major sugarcane growing regions distinct in terms of climate and administration: the South region comprising Kolhapur, Sangli, and Satara districts; the Central region comprising Ahmednagar, Nashik, Pune, and Solapur districts; and the North-East region comprising districts under the administrative divisions of Amravati and Nagpur (there is little to no sugarcane grown in the coastal Western region). The South is fertile. The Central region is well-developed and irrigated, while the North-East is dry and vast. The Maharashtra Cooperative Sugar Mills Federation uses these regions to aggregate up data in its reports.

TABLE 2—ARE CANE PRICES AFFECTED IN ELECTION YEARS IN POLITICALLY CONNECTED MILLS?

	Cane price							Log cane price
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Political chairman	12.96	12.12	13.56	5.054	4.088	3.910	2.111	0.0183
	(16.33)	(14.00)	(11.98)	(14.88)	(12.81)	(15.38)	(13.20)	(0.0160)
Political chairman × election year	−20.78**	−21.11**	−19.33**					−0.0217**
	(8.228)	(9.809)	(8.266)					(0.00936)
Recovery rate			55.59***					
			(9.090)					
Chairman contests national election				−19.50*	−20.37***			
				(10.57)	(6.437)			
Chairman contests state election						0.761	5.474	
						(16.44)	(16.83)	
Mill fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall, capacity	No	Yes	Yes	No	Yes	No	Yes	Yes
Mill level controls	No	No	Yes	No	No	No	No	No
Observations	1,151	1,151	1,135	1,151	1,151	1,151	1,151	1,151
Adj R^2	0.86	0.87	0.89	0.86	0.87	0.86	0.87	0.88

Notes: The table reports coefficients from estimations of equation (1), with the cane price or log cane price as dependent variable, and a modified version of equation (1) to consider the case where sitting chairmen actually contest elections. Columns 1–3 and column 8 present regressions showing interactions with election years, while columns 4–7 present regressions modified to examine the case when sitting chairmen actually contest elections. "Political chairman" refers to years in which the mill is chaired by someone who was a candidate for state or national elections in the period 1993–2005. "Mill-level controls" include the proportion of hours lost due to machinery breakdowns and the proportion of working hours lost due to cane shortages. Standard errors are multi-way clustered by year-region as well as by mill.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

To separate out the effects of close elections from other elections, I then estimate

$$(3)\qquad Y_{mt} = \alpha + \nu PC_{mt} + \omega CloseElec_{mt} + \beta_1(PC_{mt} \times CloseElec_{mt}) + \beta_2(PC_{mt} \times Elec_t) + X'_{mt}\gamma + \delta_m + \tau_t + \epsilon_{mt}.$$

III. Results

A. *The Costs of Political Connections*

Table 2 presents results from equation (1), in which I examine whether more politically connected mills face greater pressures, including year-fixed effects to control for unobserved year effects. Prices are lower by about Rs 20 a ton in politically controlled mills during election years, a statistically significant and robust result. The results are robust to including rainfall and mill capacity as controls, as well as including mill-specific outcomes, such as the recovery rate—sugar produced per unit cane, a measure of productivity—and various other mill level shocks, such as mill breakdowns and cane shortages. These latter mill-specific outcomes amount to over-controlling, but may be important for the discussion (in the next section) on the mechanism causing price drops.

As a robustness exercise, I check that cane prices also drop when chairmen are actually contesting elections. Columns 4–7 present these results, which hold true for national politicians.[19] Column 8 shows that specifying the cane price in terms of logs rather than levels does not affect the results.[20]

A potential confound is related to mill closure. Mills might not operate in some years if they cannot raise capital for operating expenses, or do not expect sufficient cane supply, or if sugar prices are too low for the mill to operate profitably. If poorly performing mills are kept open by politicians in election years as a way to garner votes, this might explain the observed price drop results.[21] To rule out this possibility, I test whether mills are more likely to operate in election years. Column 8 in Table 3 suggest that mill closure does not seem to be affected by political control. This assuages concerns about the results being driven by the unbalanced nature of the panel.

One might expect election related pressures to be highest during close elections. Accordingly, I check whether these election year drops in politically controlled mills are particularly large during close elections (defined as elections where the victory margin was lower than 5 percent of votes cast). I find that the effect in politically controlled mills in years with close elections does seem to be higher, with effect sizes of Rs 25 as compared to Rs 21 for all elections (Rs 24 compared to Rs 20 in national elections). However, these effects cannot be statistically distinguished from the regular interaction effect due to large standard errors. (See Table 3).

Is the magnitude of these electoral effects economically significant? The election year effects are approximately 2.3 percent of average prices paid. Judged by the yearly variation in these outcomes, however, the election year drops assume more significance, amounting to about 7–20 percent of the standard deviation. Most importantly, these drops can amount to significantly large total Rupee amounts. Paying farmers Rs 20 per ton less for their cane amounts to a total of Rs 6 million (US $135,000). If indeed these drops represent mechanisms for siphoning off mill funds to finance electoral campaigns, the Rupee amounts could represent a significant slice of campaign spending. In the next subsection, I go on to discuss whether these drops represent changes in productivity or simply theft.

[19] What might account for this difference between state and national elections? The size of constituencies, the relative proportion of sugarcane-dependent voters within the electorate, and the competitiveness of elections might provide an explanation. A national constituency has about 6 times the electorate of a state constituency (1,375,000 eligible voters to 230,000 eligible voters in Maharashtra). The electorate in state constituencies that have sugar mills is likely to consist of a substantial number of cane farmers, their dependents, or other mill workers, whereas national constituencies have many voters not connected to the mill. Assuming 20,000 shareholder farmers per cooperative, this would comprise less than 1.5 percent of the national constituency but 9 percent of the state constituency. During national elections, money might be siphoned off to woo these other voters—at the cost of lower prices paid to one's supporting farmers. But politicians might not risk this during state elections. Moreover, state elections are far less competitive than national elections in sugarcane-growing areas over the study period. The average margin of victory in national constituencies is 9.6 percent, while the average margin of victory in state constituencies is 12.8 percent, and a far greater proportion of national elections are decided by a margin of 5 percent or less (40 percent to 29 percent).

[20] I also separate chairmen into state and national politicians as defined by the last election they contested. Online Appendix Table 2 shows that prices drop in election years when national politicians chair the mill, and also when they contest elections. Further robustness checks, including adjustments to the functional form, confirm the results.

[21] I have already removed the first year of a mill's operation from the data, as very little output is produced in these years, and recovery rates are abnormally low. Therefore, there is no possibility that more mills starting up in election years drives these results.

TABLE 3—CLOSE ELECTIONS, DROPPING ELECTIONS IN THE MIDDLE OF THE (SUGAR) YEAR, AND MILL OPERATIONS

	Close elections						Not considering mid-year elections	Mill not in operation
	Any		National		State			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Political chairman	12.31	6.924	5.336	9.467	4.040	3.893	7.381	−0.0281
	(14.10)	(13.04)	(12.99)	(12.91)	(12.70)	(13.25)	(12.76)	(0.0217)
Close election	2.240	8.535	9.633	2.742	10.57	10.91		
	(14.45)	(12.64)	(14.53)	(16.48)	(18.42)	(19.59)		
Political chairman × close election	−25.37*	−12.99	−24.09*	−9.971	−15.72	−16.38		
	(13.25)	(15.24)	(14.27)	(18.40)	(19.93)	(20.35)		
Political chairman × election year		−16.78		−17.33		0.744	−18.15**	−0.00237
		(11.49)		(10.65)		(12.64)	(8.733)	(0.0274)
Observations	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,874
Adj R^2	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.47

Notes: The table reports coefficients from estimations of equation (1), (2), and (3), with the cane price and whether the mill is in operation as the dependent variable. Columns 1, 2, 7, and 8 present regressions with interactions with any election year, columns 3 and 4 national elections years only, and columns 5 and 6 state elections only. "Political chairman" refers to years in which the mill is chaired by someone who was a candidate for state or national elections during 1993–2005. "Close election" refers to an election where the winning margin was less than 5 percent of votes cast. All regressions include mill fixed effects, year fixed effects, as well as controls for rainfall. Column 7 recodes 1993–1994 and 1997–1998 as nonelection years since the elections took place in the middle of the sugar year. Standard errors are multi-way clustered by year-region as well as by mill.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

B. *Productivity Drop or Embezzlement?*

Although chairmen are not involved with the day-to-day running of the mill, it is possible that mill operations and inputs are adversely affected during elections. For example, mill workers may be deputed to campaigning, and this may lead to lower efficiency. Although some of the regressions above control for the recovery rate, it is possible that the exact functional form relationship between the cane price and recovery rate may not be properly accounted for. Indeed, the recovery rate results mirror the cane price results. Mills under political control see a further drop of 0.087 percentage points in their recovery rates in election years (or 0.8 percent of average recovery rates). While these results are not robust to the addition of controls, such as rainfall and capacity, the coefficient with additional controls is statistically indistinguishable from the original coefficient. (See Table 4)

However, it does not appear as though any other indicators of mill operations or inputs are affected by political control. Machinery breakdowns and cane shortages are extremely strong predictors of the recovery rate, but they do not differ in election years. In fact, the results suggest that, if anything, politically controlled mills operate better in election years, as there are fewer hours lost due to machinery breakdowns. (Table 4, columns 3–4)[22] The main inputs into sugar production are cane, lime, and sulphur, yet none of these major inputs are effected by political control. The point

[22] This might account for the fewer hours worked overall. If mills are more efficient in crushing cane, then they need to remain open for less time.

TABLE 4—ARE OTHER MEASURES OF MILL OPERATIONS AFFECTED?

	Recovery rate		Actual hours worked	Percent hours lost to breakdown	Quantity of cane crushed	Lime added	Sulphur added	Cane planted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pol. chairman	0.0385	0.0118	119.4	−0.0900	10,250	0.000955	−0.000790	−0.0453
	(0.0673)	(0.0615)	(80.98)	(0.237)	(14,807)	(0.00445)	(0.00114)	(0.0357)
Pol. chairman × election	−0.0867**	−0.0647	−108.5**	−0.690***	−399.5	−3.99e-05	0.000430	0.0136
	(0.0367)	(0.0403)	(51.86)	(0.262)	(9,364)	(0.00320)	(0.000950)	(0.0196)
Mill fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall, capacity	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,413	1,413	1,371	1,406	1,413	1,202	1,205	409
Adj R^2	0.73	0.75	0.77	0.51	0.84	0.40	0.52	0.80

Notes: The table reports coefficients from estimations of equation (1), with mill inputs and indicators of operations as dependent variables. Standard errors are multi-way clustered by year-region as well as by mill.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

estimates on cane crushed, for example, correspond to 0.02 standard deviations. (Table 4, columns 5–7).[23]

While cane crushed might be an indicator of cane quality, one can also directly examine the amount and quality of cane planted via examining satellite images (exact procedure described in the Appendix). Obtaining cloud-free images during the correct times (at the start of the crushing season) is difficult, hence, only three years of data (2003–2005) have been collected and examined for this project. Thus, the results must be seen as illustrative. The data show that the proportion of land with high quality cane growing at the start of the harvesting season is no different in politically controlled mills in election years (column 8).[24]

Next, if mill workers and vehicles being used for electoral purposes have adverse effects on efficiency, then one might expect that the greatest effects are concentrated right at the time of elections, since the major campaign hurdle in rural areas is getting people to the polls. Moreover, the campaign season is usually fairly short, since

[23] There is a mechanical relationship between the amounts of these inputs used and the amount of sugar eventually produced. A given amount of extracted juice requires a particular amount of lime and sulphur. Significantly lower amounts of cane crushed might indicate the existence of unobserved pest- or drought-related shocks that could reduce output per unit cane, while significantly higher amounts of cane crushed might reduce output per unit cane in case the extra cane crushed is marginal and of lower quality. Lime is added to extracted juice to balance pH and clump together impurities, and sulphur is bubbled through the juice to bleach it.

[24] The fact that the supply of cane is inelastic to election timing can be explained by institutional and agricultural features. First, the command area system explained above means that farmers cannot sell to other mills, and selling cane for purposes other than sugar production fetches drastically lower prices. Second, sugarcane is harvested annually, but it is not planted annually. It regrows from its cut stalk for another two to four years after harvest, and it is much more cost effective to grow this "ratoon" crop rather than plant a new crop. In order to adjust supply in election years, farmers would have to accurately predict both election years and the duration of their ratoon crop at the time of planting, which is extremely difficult. Third, it is not easy to adjust other inputs, such as fertilizer, pesticide, or seed quality, that affect yield. All these inputs are actually provided by the mill, which also provides agricultural extension officers to monitor cane progress.

candidates receive party nominations only about a month in advance. Consequently, elections that take place during the crushing season, when the factory is running, would see greater drops in prices and recovery rates, all else equal. In fact, I find that elections held when mills are closed see bigger price effects than those held when mills are open (online Appendix Table 3).

A final piece of evidence in favor of the hypothesis that funds are appropriated to finance electoral campaigns is that the missing amounts correspond well to what is generally spent on elections. The section above noted that price drops could account for roughly Rs 6 million of missing mill revenues. For comparison, current legal limits for spending on campaign finance are Rs 2.5 million in national constituencies and Rs. 1 million in state constituencies, but it is no secret that these limits are regularly flouted. While it is difficult to figure out how much money candidates actually spend on elections, observers have suggested amounts ranging from Rs 1.1 million (a figure suggested by Ganesan 1997 when the limit was Rs 450,000) to Rs 10 million (Aiyar 2000) for national elections.[25] The amounts appropriated from mills are thus very much in the ballpark of what one would spend to finance an election campaign.

IV. Theft or Campaign Contribution?

The fact that politicians tax their own supporters by paying them lower prices in election years stands in contrast to the literature on political connections, which emphasizes benefits to connected firms. In addition, the literature on political cycles generally finds increases in budgetary allocations in election years. Theories of tactical redistribution, however, suggest that politicians will target resources to maximize their electoral success (Wright 1974; Dixit and Londregan 1996; Grossman and Helpman 1996; Snyder 1989). Cole (2009) finds that incumbent governments pressure public banks to allocate agricultural credit to constituencies which have close elections. Dahlberg and Johansson (2002) find that grants were allocated to constituencies with large numbers of swing voters.

This theory and supporting evidence suggests that politicians maximizing the probability of getting elected face an allocation problem with respect to transfers. The optimal campaign strategy might indeed involve taxing your own supporters and redistributing toward other voters if your supporters' elasticity of voting with respect to transfers is relatively low, and/or they comprise a small yet rich proportion of the voting population.[26] The latter contention is most likely true in the Indian context. Shareholders of a particular mill would amount to only 1.5 percent of the average electorate in a *national* constituency, while Mullainathan and Sukhtankar (2011) find that sugarcane farmers are 33 percent richer than other farmers in Tamil Nadu. Moreover, sugarcane farmers may be constrained by the institutional arrangement, since they can only sell their cane to the mill in their command area; and

[25] For comparison, in the 2008 US election, Democrats spent, on average, $1 million per House seat, and $6 million per Senate seat (www.fec.gov).

[26] It is also possible that farmers simply cannot distinguish election year embezzlement and lump it together with other types of mismanagement.

perhaps government control over sugar trade confers rents upon them that preclude them from shifting to other crops.

On the other hand, observers suggest that cooperative sugar mills have intensely contested internal elections (Attwood 1992). Cane prices paid are an important issue in these elections, and chairmen who pay low prices would be subject to electoral punishment.[27] A possible explanation for why sugarcane farmers' votes might be inelastic to taxes could be that mill chairmen may compensate farmers by channeling funds from state finances after winning elections.

Winning an election gives the chairman access to various sources of government funds, which she might choose to channel back to the mill. However, mills whose chairmen win elections might be systematically different from those whose chairmen lose. For this reason, I compare the outcomes of winning and losing mills before and after elections. I run the following estimation:

$$(4) \qquad Y_{mt} = \alpha + \beta_1 CNW_{mt} + \beta_2 CNL_{mt} + \beta_3 CNW_{m(t-1)} + \beta_4 CNL_{m(t-1)} + X'_{mt}\gamma + \delta_m + \tau_t + \epsilon_{mt},$$

where CNW_{mt} is an indicator for whether the mill chairman *won* national elections *this* year; CNL_{mt} is an indicator for whether the mill chairman *lost* national elections *this* year; $CNW_{m(t-1)}$ is an indicator for whether the mill chairman *won* national elections the *previous* year; and $CNL_{m(t-1)}$ is an indicator for whether the mill chairman *lost* national elections the *previous* year. This estimation has exactly the same set of controls described in equation (1). The outcomes I consider are those most important to farmers: cane prices and whether the mill was closed or not.

Another potential source of benefits to mills may be the mill chairman's political party. Even if a mill executive is not contesting external elections, it is possible that the mill contributes to political campaigns (see, for example, Baviskar 1980), and might receive compensation if the party goes on to form the government. To test this channel of benefits, I estimate

$$(5) \quad Y_{mt} = \alpha + \beta_1 PartyCenter_{mt} + \beta_2 PartyState_{mt} + X'_{mt}\gamma + \delta_m + \tau_t + \epsilon_{mt},$$

where $PartyState_{mt}$ is an indicator for whether the party affiliated with the mill chairman is currently in power at the state level; and $PartyCenter_{mt}$ is an indicator for whether the party affiliated with the mill chairman is currently in power at the federal level. This is a powerful test of whether political power actually leads to benefits for farmers. Since there are many cases where neighboring mills are affiliated with different political parties, this estimation is identified off changes in government.

I separate politically connected mills by whether their chairmen won or lost elections, and estimate equation (4). Table 5 presents these results. Mills whose chairmen won national elections pay substantially higher prices—amounting to Rs 80 per ton

[27] It is possible that if factors, such as ethnicity or village ties, are more important than cane prices, then stealing and low prices would go unpunished in internal elections. However, most cane farmers are ethnic Marathas (Attwood 1992; Baviskar 1980).

TABLE 5—MILL OUTCOMES IN WINNING AND LOSING MILLS

	Cane price				Mill closed	
	State (1)	National (2)	State (3)	National (4)	State (5)	National (6)
Political chairman × election year	−3.688	−16.63**				
	(11.71)	(8.475)				
Political chairman × year after	−8.533	9.990				
	(12.18)	(11.15)				
Chairman won × election year			16.13	−5.782	0.0162	−0.0943*
			(20.30)	(16.33)	(0.0247)	(0.0558)
Chairman lost × election year			−10.55	−17.87	−0.0173	−0.0537
			(17.36)	(13.39)	(0.0295)	(0.0398)
Chairman won × year after			4.039	79.21*	0.0195	−0.193**
			(16.81)	(46.35)	(0.0356)	(0.0766)
Chairman lost × year after			−39.79***	−8.001	−0.0202	−0.0264
			(10.97)	(24.47)	(0.0275)	(0.0512)
Mill fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall, capacity	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,151	1,151	1,151	1,151	1,874	1,874
Adj R^2	0.87	0.87	0.87	0.87	0.47	0.47

Notes: The table reports coefficients from estimations of equation (1) with additional interactions for the year after elections—(columns 1 and 2), as well as equation (4) (columns 3, 4, 5, 6), with the cane price and an indicator for whether the mill is closed as dependent variables. Standard errors are multi-way clustered by year-region as well as by mill.

***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

more—in the year after elections (column 4).[28] Note that this is not simply a bounce back to normal prices after the election year drop. Winning mills actually pay higher than average prices in the year after elections. Mills whose chairmen lost national elections, on the other hand, pay slightly lower than average prices in the year after elections. While I cannot reject equality between the coefficients on winning and losing mills *during* election years, I can indeed reject equality in the year *after* elections. Chairmen who win national elections seem to be able to keep their mills open far more successfully than chairmen who lose (column 6).[29] These results must necessarily be interpreted with caution, since national elections are not separated much by time, and politicians winning may depend on the amounts raised previously.

Finally, there is also evidence that farmers are compensated via political parties. I find that when the party affiliated with the mill chairman is in power in Maharashtra,

[28] Given that national elections happened in quick succession in the late 1990s, the year 1999 could be considered both an election year and the year after election. The results are robust to classifying it either way (or both, or neither. Basically this year doesn't drive the results).

[29] Anecdotal evidence suggests how politically powerful chairmen are able to keep their mills operating by procuring loans from cooperative banks, even though their mills perpetually default on these loans (Mishra 2007). Farmers care very much about the mill being open for crushing. Since planting decisions have to be made a year in advance, the sudden closing of a mill is extremely costly for farmers. Without a mill to buy their cane, farmers have to scramble to find another mill nearby, one that is under no obligation to buy their cane. In the worst circumstances, farmers have been known to simply burn their crops rather than accept sharply reduced prices from other mills or jaggery producing units (Hardikar 2007).

Table 6—Pay Back from Party

	Cane price		Recovery rate		Mill closed	
	(1)	(2)	(3)	(4)	(5)	(6)
Affiliated party rules State	22.72**	22.91***	0.0966*	0.0985*	0.00743	0.00862
	(10.36)	(8.619)	(0.0558)	(0.0551)	(0.0193)	(0.0194)
Affiliated party rules Nation	−11.17	−9.740	−0.0687	−0.0784*	0.0184	0.0145
	(9.630)	(9.100)	(0.0563)	(0.0473)	(0.0194)	(0.0185)
Mill fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Rainfall, capacity	No	Yes	No	Yes	No	Yes
Observations	1,151	1,151	1,413	1,413	1,874	1,874
Adj R^2	0.86	0.87	0.73	0.75	0.44	0.47

Notes: The table reports coefficients from estimations of equation (5) with mill outcomes as dependent variables. Standard errors are multi-way clustered by year-region and mill.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

the mill pays Rs 23 more in cane prices (Table 6). Individual state legislators have less access to discretionary funds than national legislators, and, hence, may not have the ability to compensate farmers themselves after they win elections, but being part of the party in power might give them the ability to do so. Moreover, these results are also consistent with the fact that politically controlled mills see drops in output and prices in election years regardless of whether the individual mill's chairman is competing in external elections. Politically controlled mills may be contributing to party coffers, and consequently would expect to benefit when their party wins elections.

There are a number of reasons why politicians might choose to raise money in this indirect manner. First, as noted above, legal campaign finance limits in India are extremely low. Mills would not be able to make direct contributions of these amounts. Second, expropriating from mill funds solves the collective action problem in political contributions and reduces transaction costs related to soliciting funding from individual farmers. In an environment with numerous small and medium-sized farmers, these problems and costs are likely to be large.

Indeed, we have evidence that in the past mills directly collected funds from farmers for political party coffers. Baviskar (1980) notes

> *Kisan [a cooperative mill] has made substantial contributions to Congress funds. In one year, the factory collected for the party 25 paise per tonne of cane supplied by its shareholders. Thus, in a single year more than Rs 50,000 was collected. Although this contribution was voluntary in theory, in practice most shareholders were pressurized to contribute. This method of collecting party funds was followed in other co-operatives too and leaders were able to collect over Rs 1,50,000 for the Taluka Congress Committee in a very short time.*

I am unable to find any evidence of such direct contributions in recent times. In any case, the institutional arrangement may make it possible for politicians to make commitments to farmers to pay back ex post rather than inflating prices ex ante.

There are limits to re-matching between mills and chairmen. Chairmen-politicians cannot suddenly move to a different constituency to contest elections. Knowing that politicians are tied to the mill, farmers might be willing to accept election-year losses. The repeated interaction of politicians and farmers might form the basis of a reciprocal relationship.

Farmers must have a reasonable expectation that they will benefit from their support of politician-chairmen. While I do not have the data available to do a careful calculation of benefits net of costs, I can perform a rough calculation to see whether farmers make a reasonable return on their "investment." I assume that the probability of winning a national election conditional on contesting is one-third, equal to the lowest proportion of contesting candidates who won in my sample. From Table 5, I note that prices were Rs 80 higher than normal in the year after elections in winning mills. Thus, farmers can expect to receive about Rs 27 on their principal of Rs 20 (the election year drop in mills with contesting chairmen), a real rate of return of 35 percent. Given the average amount of cane crushed, in expectation a farmer gains about $40 per election.[30]

V. Conclusion

This paper examines an agricultural commodity market and finds evidence of electoral cycles in outcomes of sugar mills in Maharashtra. In particular, the cane price falls by approximately Rs 20 in politically controlled mills during election years. These drops translate to an economically significant drop in revenues of Rs. 6 million (US $135,000) per election year per mill. Evidence suggests that the profit decline is not due to effects on mill operations, but rather due to appropriation of funds for electoral purposes. These results supplement previous literature on political cycles, which has focused on the spending rather than the raising of campaign finance.

From the perspective of farmers, this fall in prices could represent either pure theft by mill chairmen, or indirect campaign contributions. Given that it is unlikely that farmer-shareholders are completely ignorant of stealing and electoral cycles, and that internal mill elections are competitive, the latter interpretation seems plausible. Testing for whether farmers receive anything in return, I find that chairmen who win national elections pay higher cane prices in the year after elections. Moreover, when the party affiliated with the mill's chairman is in power at the state level, the mill also pays higher cane prices. This set of results must be interpreted with caution, however, as they offer only one possible explanation for why price manipulation may continue.

The overall effect on farmer welfare is difficult to determine. On average, cane prices and recovery rates in politically connected mills are no different than those in nonpolitically connected mills, and the levels of public goods are no different either. Nonetheless, it is possible that there are costs and benefits not captured in the outcomes that I consider. Even more difficult to measure are the overall costs

[30] On the other hand, there are no observable differences in the availability of public goods in villages near (within a 15 km radius) politically connected versus nonpolitically connected mills. These average figures do not preclude the possibility that the money siphoned off from cane prices in election years is spent on public goods but that such spending on public goods falls dramatically in nonelection years. Such a scenario seems unlikely, however, at least for the kinds of goods (schools, health centers, etc) in the data. Results available on request.

or benefits to society; the diversion of state funds by the politically powerful to their favored sugar mills may have associated welfare costs (see, for example, Khwaja and Mian 2005).

Complementing the previous literature on political connections and political cycles, this paper finds that politicians extract rents from firms in order to further their personal electoral goals. The paper also disentangles the costs and benefits of political connections across time, and suggests that studies of political connections should incorporate a longer time horizon in order to capture periods when connected politicians require financing for their own aims.

REFERENCES

Agricultural Census of India. 2001. Agricultural Census Database. Ministry of Agriculture.

Aigner, Dennis J. 1973. "Regression With a Binary Independent Variable Subject to Errors of Observation." *Journal of Econometrics* 1 (1): 49–59.

Aiyar, Swaminathan S. Anklesaria. 2000. "Should Money Influence Elections." *The Times of India*, October 25. http://swaminomics.org/?p=952.

Alesina, Alberto, and Nouriel Roubini. 1997. *Political Cycles and the Macroeconomy.* Cambridge, MA: MIT Press.

Attwood, Donald W. 1992. *Raising Cane: The Political Economy of Sugar in Western India.* Oxford: Oxford University Press.

Banerjee, Abhijit, Dilip Mookherjee, Kaivan Munshi, and Debraj Ray. 2001. "Inequality, Control Rights, and Rent Seeking: Sugar Cooperatives in Maharashtra." *Journal of Political Economy* 109 (1): 138–90.

Baviskar, B. S. 1980. *The Politics of Development: Sugar Co-operatives in Rural Maharashtra.* Delhi: Oxford University Press.

Bertrand, Marianne, Francis Kramarz, Antoinette Schoar, and David Thesmar. 2006. "Politicians, Firms, and the Political Business Cycle: Evidence from France." Unpublished.

Besley, Timothy, and Stephen Coate. 1997. "An Economic Model of Representative Democracy." *Quarterly Journal of Economics* 112 (1): 85–114.

Bunsha, Dionne. 2003. "Sugar Daddies." *New Internationalist Magazine*, December 1. http://www.newint.org/features/2003/12/01/sugar-daddies/.

Cameron, Colin, Jonah B. Gelbach, and Douglas L. Miller. 2011. "Robust Inference with Multiway Clustering." *Journal of Business and Economic Statistics* 29 (2): 238–49.

Cole, Shawn. 2009. "Fixing Market Failures or Fixing Elections? Agricultural Credit in India." *American Economic Journal: Applied Economics* 1 (1): 219–50.

Dahlberg, Matz, and Eva Johansson. 2002. "On the Vote-Purchasing Behavior of Incumbent Governments." *American Political Science Review* 96 (1): 27–40.

Dinc, I. Serdar. 2005. "Politicians and Banks: Political Influences on Government-Owned Banks in Emerging Markets." *Journal of Financial Economics* 77 (2): 453–79.

Dixit, Avinash, and John Londregan. 1996. "The Determinants of Success of Special Interests in Redistributive Politics." *Journal of Politics* 58 (4): 1132–55.

Faccio, Mara. 2006. "Politically Connected Firms." *American Economic Review* 96 (1): 369–86.

Faccio, Mara. 2010. "Differences between Politically Connected and Nonconnected Firms: A Cross-Country Analysis." *Financial Management* 39 (3): 905–27.

Faccio, Mara, Ronald W. Masulis, and John J. McConnell. 2006. "Political Connections and Corporate Bailouts." *Journal of Finance* 61 (6): 2597–2635.

Fisman, Raymond. 2001. "Estimating the Value of Political Connections." *American Economic Review* 91 (4): 1095–1102.

Ganesan, K. 1997. "Corruption in the Political Process." In *Corruption in India: Agenda for Action*, edited by S. Guhan and Samuel Paul, 29–59. New Delhi: Vision Books.

Gingerich, Daniel. 2010. "Dividing the Dirty Dollar: The Allocation and Impact of Illicit Campaign Funds in a Gubernatorial Contest in Brazil." Unpublished.

Grossman, Gene M., and Elhanan Helpman. 1996. "Electoral Competition and Special Interest Politics." *Review of Economic Studies* 63 (2): 265–86.

Hardikar, Jaideep. 2007. "Burning Down Standing Surgarcane Crops." *India Together*, May 30. http://www.indiatogether.org/2007/may/agr-burncane.htm.

Jayachandran, Seema. 2006. "The Jeffords Effect." *Journal of Law and Economics* 49 (2): 397–425.
Kapur, Devesh, and Milan Vaishnav. 2011. "Quid Pro Quo: Builders, Politicians, and Election Finance in India." Center for Global Development Working Paper 276.
Khwaja, Asim Ijaz, and Atif Mian. 2005. "Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market." *Quarterly Journal of Economics* 120 (4): 1371–1411.
Mishra, Ambarish. 2007. "Pratibha's Sugar Mill a Loan Defaulter?" *The Times of India*, June 23. http://articles.timesofindia.indiatimes.com/2007-06-23/india/27970924_1_sugar-factory-sugar-co-operatives-loan-defaulter.
Mitra, Subrata K., and V. B. Singh. 1999. *Democracy and Social Change in India: A Cross-Sectional Analysis of the National Electorate.* New Delhi: Sage Publications.
Mullainathan, Sendhil, and Sandip Sukhtankar. 2011. "Ownership Structure and Economic Outcomes: The Case of Sugar Mills in India." Unpublished.
Ramesh, Randeep. 2008. "Diamonds Fail to Take Shine off India's Political Champion of the Poor as Earnings Reach £7.7m." *The Guardian*, February 5. http://www.guardian.co.uk/world/2008/feb/06/india.international.
Shi, Min, and Jakob Svensson. 2003. "Political Budget Cycles: A Review of Recent Developments." *Nordic Journal of Political Economy* 29 (1): 67–76.
Shleifer, Andrei, and Robert W. Vishny. 1993. "Corruption." *Quarterly Journal of Economics* 108 (3): 599–617.
Shleifer, Andrei, and Robert W. Vishny. 1994. "Politicians and Firms." *Quarterly Journal of Economics* 109 (4): 995–1025.
Sirsikar, V. M. 1995. *Politics of Modern Maharashtra.* Mumbai: Orient Longman.
Snyder, James M. 1989. "Election Goals and the Allocation of Campaign Resources." *Econometrica* 57 (3): 637–60.
Sridharan, E. 1999. "Toward State Funding of Elections in India? A Comparative Perspective on Possible Options." *Journal of Policy Reform* 3 (3): 229–54.
Sridharan, E. 2006. "Electoral Finance Reform: The Relevance of International Experience." In *Reinventing Public Service Delivery in India*, edited by Vikram Chand, 363–88. New Delhi: Sage Publications.
Stigler, George J. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science* 2 (1): 3–21.
Sukhtankar, Sandip. 2012. "Sweetening the Deal? Political Connections and Sugar Mills in India: Dataset." *American Economic Journal: Applied Economics*. http://dx.doi.org/10.1257/app.4.3.43.
Thompson, Samuel B. 2011. "Simple Formulas for Standard Errors That Cluster by Both Firm and Time." *Journal of Financial Economics* 99 (1): 1–10.
Wright, Gavin. 1974. "The Political Economy of New Deal Spending: An Econometric Analysis." *Review of Economics and Statistics* 56 (1): 30–38.
Yadav, Yogendra. 2002. "Understanding the Second Democratic Upsurge: Trends of Bahujan Participation in Electoral Politics in the 1990s." In *Transforming India: Social and Political Dynamics of Democracy*, edited by Francine R. Frankel, Zoya Hasan, Rajeev Bhargava, and Balveer Arora, 120–45. New Delhi: Oxford University Press.