Courant Research Centre
'Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis'

Georg-August-Universität Göttingen
(founded in 1737)

Discussion Papers

No. 170

Crime, Incentives and Political Effort:
A Model and Empirical Application for India

Kai Gehring, T. Florian Kauffeldt,
Krishna Chaitanya Vadlamannati

August 2015

Wilhelm-Weber-Str. 2 · 37073 Goettingen · Germany
Phone: +49-(0)551-3914066 · Fax: +49-(0)551-3914059

Email: crc-peg@uni-goettingen.de Web: http://www.uni-goettingen.de/crc-peg

Crime, Incentives and Political Effort: A Model and Empirical Application for India*

Kai Gehring
(University of Heidelberg, University of Zurich)

T. Florian Kauffeldt
(University of Heidelberg)

Krishna Chaitanya Vadlamannati
(Norwegian University of Science and Technology)

This version: August 25, 2015

Abstract

We develop a model of the incentives faced by members of parliament (MPs) when deciding whether to engage in effort for their constituencies to assess the effects of their having a criminal background. Political representatives with criminal backgrounds are considered a great problem in many countries. In particular in India, a public disclosure revealed that a large proportion of politicians currently face criminal charges. This has led to a heated public debate and emerging literature assessing the causes and effects of this disturbing phenomenon. We use a comprehensive set of three proxies to meausure effort in the 14^{th} Lok Sabha over the 2004-2009 legislative period: attendance rates, parliamentary activity, and utilization rates of a local area development fund. We find that MPs facing criminal accusations exhibit on average about 5% lower attendance rates and lower fund utilization rates, and less (but insignificantly) parliamentary activity. As predicted by the model, these differences depend on the development level of the constituency, a proxy for rent-seeking possibilities and monitoring intensity. We argue and demonstrate why these negative relations should constitute an upper bound estimate of the causal effect, and show that even under conservative assumptions the effect is unlikely to be caused by unaccounted selection-bias.

Keywords: India, Elections, Crime, Good and Bad Politicians, Development, Attendance and Activity in Parliament, Political Economy

JEL classifications: D72, H11, I38

*Acknowledgments: We thank all researchers and referees who shared advice and data, and want to express our gratitude for comments and advice during conference presentations at the European Political Science Association 2015 Conference in Vienna, the European Public Choice Society 2015 in Groningen, the CSAE 2015 Conference at Oxford University and an internal seminar at Heidelberg University. Important research assistance was provided by Katrin Mauch, Muhamed Kurtisi, Franziska Volk and Sven Kunze. All remaining mistakes are ours.

1 Introduction

India 2014: The world's largest democracy features a parliament where roughly 34% of the recently elected members of the 16th Lok Sabha, the lower house of the Indian parliament, face pending criminal charges.[1] A significant share of those face serious criminal charges ranging from rape to murder.[2] The Indian and international media have reported on this issue, and it is widely believed that it poses a threat to the Indian democracy in general and the constituencies represented by those individuals specifically. Criminals in politics is an issue that is important for a wide range of countries worldwide. It is an important issue with a widespread impact but the unavailability of data has impeded the analysis of its consequences. We outline why India is a unique case that allows us to assess the economic and developmental consequences of parliamentarians with pending criminal charges holding public office.

While there is some anecdotal evidence that electoral constituencies represented by Members of Parliament (MPs) with pending serious criminal charges remain underdeveloped and such members tend to underperform in terms of their effort in parliament, systematic empirical evidence remains scant. Can criminal charges explain the variations in parliamentarians' performance in parliament and the development of their electoral constituencies? To explore this question we develop a model of MP incentives in a principal agent approach where the voters take the role of the principal. The existing literature has modeled the effect of electoral accountability on economic policy choices (Besley and Case, 1993), of compensation on policy outcomes (Besley, 2004), and of outside income opportunities on self-selection and behavior Gagliarducci et al. (2011). However, there is to the best of our knowledge no model that has approached the question of what drives MP effort in parliament, or more specifically for their constituency, once they are elected into office.[3]

We connect to the emerging literature on electoral competition in the context of India. For instance, Aidt et al. (2015) investigate why parties field criminal candidates and Dutta and Gupta (2012) analyze competition between candidates that include criminals. In their seminal paper, Besley and Burgess (2002) model incumbents of different unobservable types who can exert effort to help voters in need. Since we focus on the relationship between incumbents and voters, our model is complementary to the first two papers and contrasts that of Besley and Burgess (2002) by focusing particularly on the behavior and characteristics of criminal incumbents. In our model, MPs are aware that a higher effort level increases the probability of being reelected, but they lose utility from time allocated to political work. Thus, there is an immediate tradeoff between minimizing effort and the chance of being reelected. Other determinants of voting decisions matter as well. Using comparative statics with respect to the model parameters we demonstrate, for instance, that the effort of criminal MPs should be relatively higher when they contest

[1] See: http://timesofindia.indiatimes.com/news/Every-third-newly-elected-MP-has-criminal-background/articleshow/35306963.cms? The members of the 16th Lok Sabha were elected during the 2014 national elections held between 7th April and 12th May 2014. The 16th Lok Sabha commenced on 4th June 2014.

[2] Roughly 21% of the members face serious charges such as murder, rioting, theft, kidnapping, rape, etc., see: http://adrindia.org/research-and-reports/election-watch

[3] There is a literature on political competition which could mitigate the effect of a candidate with a criminal background if political parties can make credible commitments to the voters and are thereby able/likely discipline their party members (e.g., Besley and Coate (1997)). However, in the Indian context Keefer and Khemani (2004) argue that the biggest obstacle for development is the lack of credibility of promises made by the political parties. Under such circumstances, elections only serve the purpose of removing the incumbent in the constituency from power (or keeping the incumbent in power).

in more developed electoral districts.

In order to empirically test our hypotheses we use details about the criminal records of the candidates available thanks to a 2003 Indian Supreme Court judgment that made it mandatory for every candidate contesting state and national elections to provide sworn affidavits detailing their background. These include details not only about their personal, educational, and financial particulars, but also detailed information on any criminal charges they had faced, the status of their criminal cases and any pending charges against them.[4] We use criminal charges as a signal whether a MP is a criminal type, and refer to those with pending charges as criminal MPs in the rest of the paper. To alleviate potential bias in our estimates caused by measurement error due to individual false charges, we run all regressions both with a binary variable *Criminal(a)* coded one for those with a least one charge and *Criminal(b)* which takes the value one only for those with more than one charge. We study the 14^{th} (2004-2009) instead of the 15^{th} Lok Sabha (2009-2014) or a combination of both because a delimitation commission set up in 2002 changed the electoral boundaries of constituencies between the 14^{th} and 15^{th} Lok Sabha elections, making it impossible to match constituencies. Using the 14th Lok Sabha allows us to control for confounding factors such as past electoral performance or party strongholds which are crucial in determining MP effort.

We want to assess whether elected candidates with criminal records differ from their colleagues with regard to effort. Various measures have been used in the literature to gauge MP effort. Instead of picking just one factor, which might not capture differences between MPs comprehensively, we use three measures that each capture a different facet of MP behavior. First, we use attendance rates (respectively absenteeism) as for example in Besley and Larcinese (2011); Gagliarducci et al. (2010, 2011) and Mocan and Altindag (2013). Second, we make use of MPs' effort in parliament by considering information on the number of questions they asked and their participation in debates (cf. Mocan and Altindag 2013, Arnold et al. 2014). While both of these measures capture effort, one might question their relevance for the electorate. Using economic outcomes like consumption as in Chemin (2012), on the other hand, is rather disentangled from MP behavior, which makes it more problematic to draw a causal link to MP effort. Thus, we draw on Keefer and Khemani (2009) and use the cumulative utilization rate of the Member of Parliament Local Area Development Scheme (MPLADS henceforth). The fund is intended for the development of electoral constituencies and offers several advantages in making the effort that MPs undertake on behalf of their constituencies observable. While details are outlined below, some advantages are that the amounts available are identical across constituencies, implementation of projects requires substantial effort on behalf of the MP, projects are clearly identifiable with the MP's name and the considerable media coverage that makes it likely that voters learn about the effort.

The observation level is the 543 constituencies, which each elect one MP in a first-past-the-post-system. We find that across specifications, *Criminal(a)* is related to around 5% higher absenteeism rates. Parliamentary activity, on the other hand, does not differ significantly between criminal and non-criminal MPs in our baseline specification. As suggested by our model, criminal MPs show both significantly lower attendance rates and less parliamentary activity in constituencies that are economically underdeveloped. The reason for the latter could lie in better monitoring of politcians' behaviour in the more developed constituencies

[4] The court also asked the Election Commission of India to make it mandatory to publicize the information about electoral candidates provided through these affidavits. Voters can now use this information to make better informed electoral choices.

and/or the greater attractiveness of these constituencies for criminals in terms of rent-extraction possibilities. The coefficients become more negative when we use our *Criminal(b)* indicator instead. MPLADS fund utilization is lower for criminal MPs in general, but only significant for *Criminal(b)*.

The most obvious challenge for econometric identification is posed by omitted variable bias, in particular selection effects. Selection bias could arise if expected effort generally differs in those constituencies that have voted for a criminal MP. The direction of the bias is not ex ante trivial, as we can infer from our model. It would be negative, if, for example, less developed electorates are more likely to elect a criminal and it would be harder to recommend an MPLADS project in such a constituency. A positive bias would occur if less developed constituencies are more likely to elect a criminal and exhibit higher MPLADS utilization rates because it is easier to identify necessary projects. As the common *a priori* assumption is a negative relationship between *Criminal* and effort, we would be less concerned about upward bias, because our estimated negative coefficient would then be an upper bound of the true effect.

As part of our strategy to identify the causal effect of having a criminal background on the outcome variables, we first use the model as a theoretical foundation to derive an extensive set of relevant constituency- and MP-specific control variables. Second, fixed effects for major states ensure that the results are not driven by factors specific to certain Indian regions such as, for example, economic underdevelopment. Fixed effects for major parties ensure that the coefficient estimates are not driven by unobserved factors specific to a party or related to being part of the government or opposition. Third, we get identical results using alternative matching estimators and show that the control and treatment groups are strongly balanced. Results from treatment effect estimations that model the selection process explicitly yield slightly more negative estimates. For example, when controlling for selection, both *Criminal(a)* and *Criminal(b)* are significantly related to lower development fund utilization rates. This suggests that, if anything, omitted variables and/or selection effects seem to bias our coefficients for criminal background towards zero. For the negative relationship between *Criminal(b)* and MPLADS utilization rates, we use selection-on-observables to demonstrate why this is, under relatively mild assumptions, an upper bound estimate of the negative effect. Moreover, we use methods developed in Altonji et al. (2005) to demonstrate that on average selection bias (on unobserved factors) would have to be between two and sixteen times greater than selection on observed factors to fully explain the negative relationship between *Criminal* and attendance rates or MPLADS utilization. As we have plausibly identified the most relevant influencing factors in our model, it seems that criminal MPs are indeed detrimental to their constituency.

The rest of the paper is structured as follows: in the next section we summarize the relevant literature. We then present our theoretical framework yielding testable hypotheses on the impact of having a criminal background on parliamentarians' efforts in parliament and those made towards the development of their electoral constituencies. Section 4 describes our data, methods and estimation strategy. Section 5 presents the results and discussion and section 6 concludes and gives policy implications.

2 Literature

This paper connects to the growing literature concerned with the political system of India, and the many challenges that threaten the world's largest democracy. Besley and Burgess (2002) explore the relationship between electoral accountability and the responsiveness of state governments to falls in production. Their model highlights the importance of information flowson politicians' actions.In partiuclar, the criminalization of politics in India has received significant interest. A first strand of literature on this topic is focused on understanding why political parties field candidates with criminal backgrounds in elections in the first place and why voters elect these candidates. This issue has not been subject to intense scrutiny, although a handful of studies exist. Building on a theoretical model, Aidt et al. (2015) argue and find that political parties in India field candidates with criminal backgrounds when faced with intense electoral competition. One reason brought forward to explain this is that these candidates possess certain electoral advantages such as money and "muscle power", which they can use to influence the electoral outcome in poorer electorates and under conditions of low voter literacy levels.[5] In contrast, Vaishnav (2011) finds no evidence in favor of electoral competitiveness increasing the likelihood that political parties in India will field criminal candidates when examining 28 state elections.[6]

This does not mean that voters are unable to recognize this problem. Dutta and Gupta (2012) reveal that voters actually punish candidates with criminal charges that contest in elections.[7] This suggests that one issue might be the intensity of monitoring by voters: if monitoring costs are too high fewer constituents might be aware of candidates' characteristics. In addition, the effects tend to vanish when there are other candidates with criminal charges running for election in the constituency. Under such conditions, the vote share gained by criminal candidates and candidates with enormous declared wealth also tends to increase. These findings are contradicted by Banerjee et al. (2009). Their evidence in a field experiment suggests that voters in rural India tend to vote on caste (ethnic) considerations even after being provided with information on the criminal background details of the contesting candidates. This suggests that positive preferences for certain characteristics that criminals possess can be enough to trump anti-corruption efforts and help criminal candidates get elected.

The second strand of literature focuses on the consequences of electing candidates with criminal backgrounds. In their state-level analysis covering a period of over 20 years, Kapur and Vaishnav (2011) show the ominous nexus between the candidates contesting elections (especially the ones with a criminal background) and the construction sector. Often, the candidates contesting in elections stash their illegal money and assets with builders in real estate in return for quid pro quo benefits. Prior to elections, the illegal money parked in the real estate sector is routed to fund election campaigns for these criminal politicians. Kapur and Vaishnav argue that as a result of this quid pro quo deal the economy grows less during these years, as measured by a reduction in the consumption of cement and other indispensable raw materials.

The studies that come closest to ours are Chemin (2012) and Prakash et al. (2014). Chemin (2012) examines the relationship between parliamentarians in India with criminal backgrounds and consumption levels in their respective constituencies. He finds that poverty levels tend to be higher and consumption lower in constituencies which are repesented by MPs with a criminal backgound. The paper by Prakash et al. (2014) examines the economic consequences of Members of State Legislative Assembly (MLAs)

[5] See Hanusch and Keefer (2013) for a review of literature on when and why vote buying prevails in democratic societies.

[6] However, he does find that the personal wealth of criminal candidates is correlated with the criminal status of the candidates, suggesting that they could have accumulated wealth over their years of criminal activities. A similar correlation is found by Paul and Vivekananda (2004), who review the information provided by the candidates contesting in the 2004 national elections in India.

[7] Similar results in other countries are found by Brollo (2010) and Ferraz and Finan (2011).

having a criminal background. Using satellite nightime light data across 20 major states in India, they find that electoral constituencies represented by MLAs with a criminal background see a lower level of economic development as measured by nighttime light data. The main drawback of these papers is the lack of explicit transmission mechanisms through which these effects are realized. In general, it is not obvious from the existing literature whether electing candidates with criminal backgrounds can explain differences in parliamentarians' efforts in parliament and/or the varying efforts towards developing their constituencies. There is a vast empirical and theoretical literature on factors determining the performance of legislators. For instance, Svaleryd and Vlachos (2009) and Strömberg (2001, 2004) study the effect of political competition on economic outcomes. Fisman et al. (2014), Ferraz and Finan (2011), and Snyder and Strömberg (2010) examine political competition, media coverage and rent seeking behavior of incumbent politicians. More closely related to this paper, Aidt et al. (2015) model why parties choose to field a criminal candidate in the first place and Dutta and Gupta (2012) tests empirically how voters respond to candidates facing criminal charges. Our model thus extends the existing literature by examining whether and how the criminal background of an elected MP is related to differences in their effort in parliament and in developing their electoral constituencies.

3 The Model

We model the interplay between an incumbent parliamentarian and their electorate in a two-period model, similar to Besley and Burgess (2002). Consider an incumbent who was voted into office in a specific constituency at the beginning of period 1. At the end of period 1, the incumbent faces the election for the next legislative period. Voters base their decision in two dimensions: Personal characteristics and political effort exerted by the MP for their constituency.

The personal characteristics of a politician can be understood as capturing anything which can influence the voting decision of a citizen, including gender, age, wealth, party membership et cetera. Suppose there are n such personal characteristics and each characteristic can be expressed in a binary manner (i.e., male or female, old or young et cetera). Then, we may represent the personal characteristics of the incumbent as an n-dimensional vector x, where, for $k \in \{1, \ldots, n\}$, $x_k = 1$ if the incumbent exhibts characteristic 'k' and $x_k = 0$ if she does not. The facet we will focus on later is whether an incumbent faces criminal charges. In our analysis, we consider two types of incumbents who exhibit identical personal characteristics except that one faces criminal charges and the other does not. We refer to the former as criminal (c), and to the latter as non-criminal (n), where we denote the corresponding personal characteristic vectors by x^c and x^n. Let s be the characteristic which represents 'criminal charges', then it holds that $x^c_s = 1$, $x^n_s = 0$ and $x^c_k = x^n_k$ for all $k \neq s$.

In period 1, the politician chooses her effort level $e \in [0, 1]$ which represents time allocated to political work during this period. 'Effort' can be understood broadly as political activity that can be related to her position as the representative and advocate of her constituency. Marginal time costs are assumed to be 1 and linear for simplicity.[8] The reelection probability of the MP, $P(e, x)$ is influenced both by her political

[8] Our results hold for any convex cost function.

effort and her personal characteristics. Let $U > 0$[9] be the incumbent's utility from holding office, then an MP's optimization problem takes the following form:

$$\max_{e \in [0,1]} P(e,x) \cdot U - e \tag{1}$$

Voters can learn the effort level of the MP, but learning is costly. We denote the fraction of voters who choose to be informed ι. Being informed requires sufficient access to sources like electronic or print media and the ability and willingness to comprehend the information. Therefore, it seems plausible that a share of voters $(1-\iota)$, which we can illustratively think of as illiterate, poor or politically less interested, cannot afford or chooses not to learn. However, voters who belong to the latter group are not necessarily completely uninformed. They do not learn the MP's effort level , but may still know some obvious and easily accessible facts about the incumbent's and challenger's personal characteristics x_k such as gender, party and caste membership. However, the intensity of monitoring of MP activity is clearly higher with a higher share of informed voters.

The incumbent has the possibility to convince a share of the informed voters to vote for her by exerting political effort in period 1. While we assume a specific functional form of this relationship in this section for illustrative purposes, Appendix A shows that the results in Propositions 1 and 2 still hold with more general functions. Let $I(e,x) = \frac{e}{e+m(x)}$ be the fraction of informed citizens who vote for the incumbent where m is a function from the space consisting of all possible characteristic combinations into positive reals.[10] Function m can be regarded as a measure for the electoral competitiveness in the MP's constituency. It determines a proportion of the informed population, $\frac{m}{m+1}$, who would not vote for the MP regardless of her effort. The underlying reasons are voters' preferences for personal characteristics.[11] These preferences are constituency-specific: whether the membership in a party A increases or decreases, m depends on voters' preferences for A in the respective constituency.[12]

There is convincing evidence that a significant part of the Indian population is generally opposed to political criminality (Banerjee et al., 2014). While other reasons contribute to the elections of criminals, Dutta and Gupta (2012) find that, all else equal, voters penalize candidates with criminal charges. In line with the empirical evidence, we impose two assumptions. Firstly, by exerting a specific effort level, a non-criminal MP can win over a larger proportion of the population than a criminal, $m(x^c) > m(x^n)$. Secondly, effort of non-criminals has a higher marginal impact, since voters take a more skeptical stance about the political effort of criminals. This is captured by assuming $m(x^c) \cdot m(x^n) \geq 1$ which implies

[9] The utility from holding office is assumed to be strictly positive. Otherwise, a rational individual would not run for public office.

[10] $I(e,x)$ is similar to the function of Tullock (1980). However, in our model, it represents a fraction of the informed population and not a winning probability.

[11] We have not specified the voters' preferences for simplicity. One may think of, for instance, Euclidean preferences over personal characteristic: Let α_v be voter v's ideal point in the characteristic space, then voter v evaluates a characteristic profile x by $- \parallel \alpha_v - x \parallel$. The existence (resp. non-existence) of a certain characteristic k increases m if k is contained in the ideal points of the majority (resp. minority) of voters.

[12] Because it is not directly relevant for our purpose, we do not model challengers and candidate selection explicitly. It is of course likely that those challenging the incumbent will engage in election campaigns. It is plausible, however, to distinguish these election campaigns, which only transport a promise about effort, from the actual political effort which only the incumbent can exert during the previous term. Rather, the strength of candidate competition would enter as a factor in m. The lower m is, the higher the fraction of informed voters who can be convinced by a certain effort level of the MP. The empirical application will control for such factors.

that $I_e(e, x^n) > I_e(e, x^c) > 0$ for $e \in (0, 1)$.[13] Note that $I_{ee}(e, x^n) < I_{ee}(e, x^c) < 0$ which means that the difference $I_e(e, x^n) - I_e(e, x^c)$ decreases in e. The intuition here is the following. Voters' skepticism towards criminals diminishes with higher effort levels, as high political effort is perceived as s stronger and more reliable signal regarding the future effort of the MP.

The fraction $(1 - \iota)$ of uninformed voters, on the other hand, cannot be convinced by political effort, since they do not learn about effort. Instead, uninformed citizens vote randomly to some degree. Following Besley and Burgess (2002), we assume that the fraction N of uninformed citizens who end up voting for the MP is uniformly distributed on an interval $[a, 2b(x) - a]$ where $1 > b(x) > a \geq 2b(x) - 1$. As argued above, while informed voters choose not to learn about the MP's effort, they still possess information about the candidates like, for example, her name and party membership which are visible to everyone on the ballot sheet. The function $b(x)$ represents the expected level of support for the MP based on this information, a higher $b(x)$ relates to a higher expected vote share. The a represents noise in voting: The lower a the higher the variance, the higher a the lower the variance. One important aspect, which we have not explicitly incorporated in the model so far, is that criminals can use campaign practices which are not available to non-criminals such as voter intimidation or vote buying (e.g., Vaishnav, 2012). In the model, this would be best captured by assuming that criminal incumbents can push up the expected level of support from uninformed citizens. Consequently, we will assume that $b(x^c) \geq b(x^n)$.

In a first-past-the-post system, the incumbent wins the election in her constituency if[14]

$$\iota I(e, x) + (1 - \iota)N > \frac{1}{2}.$$

By using this condition, one obtains the winning probability of the MP:

$$P(e,x) = \begin{cases} 1, & \text{if } \frac{-1/2+\iota I(e,x)+(1-\iota)a}{(1-\iota)2(b(x)-a)} > 0 \\ 1 + \frac{-1/2+\iota I(e,x)+(1-\iota)a}{(1-\iota)2(b(x)-a)}, & \text{otherwise} \\ 0, & \text{if } \frac{-1/2+\iota I(e,x)+(1-\iota)a}{(1-\iota)2(b(x)-a)} < \text{-1} \end{cases}$$

The incumbent wins the election for sure if $(1 - \iota)a > 1/2$ and loses for sure if $\iota \frac{1}{1+m(x)} + (1 - \iota)(2b(x) - a) < 1/2$. In both cases, the MP's optimal effort is zero. Furthermore, if there exists an effort level $\hat{e} \in (0, 1)$ such that $P(\hat{e}, x) = 1$, it is obvious that the incumbent's optimal effort level will never exceed $\hat{e}$. We focus on the other cases. The first-order condition of equation (1) is $P'(e, x) \cdot U = 1$ (i.e., the marginal returns to effort equal its marginal costs).[15] This yields

$$z_j = \sqrt{\frac{\iota}{1 - \iota} \cdot \frac{U}{2(b(x^j) - a)} \cdot m(x^j)} - m(x^j) \tag{2}$$

where $j \in \{c, n\}$.

[13] We use the following standard notation for partial derivatives: $\frac{\partial f}{\partial x} := f_x$ and $\frac{\partial^2 f}{\partial x \partial y} := f_{xy}$.

[14] We simplify by focusing on two candidates for illustrative purposes. Extending the model with more candidates would not affect our main conclusions and introduce unnecessary complexity.

[15] Note that there are two effort levels which solve the first-order condition of equation (1). However, the other fails the second-order condition.

The optimal effort level of type j is $e_j^* = z_j$ if $z_j \in [0,1]$, which we will refer to as the interior solution in the sequel. If $z_j < 0$, then $e_j^* = 0$, and if $z_j > 1$, then $e_j^* = 1$. Assuming an interior solution, we at first consider the impact of the constituency-specific parameters on the optimal effort level regardless of incumbent type. The results are summarized in our first proposition below. Afterwards, we compare the optimal effort of a criminal and a non-criminal incumbent.

Proposition 1. The optimal effort level of the incumbent is higher if

(i) voters are better informed (high ι)

(ii) the MP's utility from holding office is higher (high U)

(iii) the expected level of support is lower (low b)

Proof. The proof is straightforward by using equation (2) □

Results (i) and (ii) make intuitive sense and do not require much interpretation. Result (iii) together with the result for the case of a certain election victory or defeat can be interpreted as being the effects of electoral competitiveness. Thus, our model can also help to explain the finding by Keefer and Khemani (2009) that effort levels are generally lower in party stronghold constituencies with little competition. The reason for (iii) is that a lower $b(x)$ decreases the length of the interval for the uniform distribution, i.e. the share of voters who vote randomly. A shorter interval results in less variance in the expected winning probability, hence the marginal effect of effort increases.

As described above, function m differs for a criminal and a non-criminal incumbent. The difference between a non-criminal and criminal incumbent is specified in Proposition 2.

Proposition 2. The difference between optimal effort levels $\Delta_{e^*} = e_n^* - e_c^*$ is

(i) strictly positive

(ii) decreasing in ι

(iii) decreasing in U

Proof. (i) By result (iii) of Proposition 1, if (i) is true for $b(x^c) = b(x^n)$, then it is true for $b(x^c) > b(x^n)$. Thus, suppose $b = b(x^c) = b(x^n)$. Then, the first-order condition of equation (1), for $j \in \{c, n\}$, is $I_e(e_j^*, x^j) = \frac{(1-\iota)2(b-a)}{\iota U}$. Hence, it holds that $I_e(e_n^*, x^n) = I_e(e_c^*, x^c)$. It follows that $e_n^* > e_c^*$, since by assumption it holds that $I_e(e, x^n) > I_e(e, x^c)$ and $I_{ee}(e, x^n), I_{ee}(e, x^c) < 0$ for all $e \in (0, 1)$. Thus, Δ_{e^*} is strictly positive. (ii) Again, suppose $b = b(x^c) = b(x^n)$, then by using equation (2) and deriving the distance with respect to the information level, we obtain $\frac{\partial \Delta_{e^*}}{\partial \iota} = \frac{1}{2(1-\iota)^2} \cdot \sqrt{\frac{(1-\iota)\cdot 2(b-a)}{\iota \cdot U}} \cdot \left(\frac{\sqrt{m(x^c)} - \sqrt{m(x^n)}}{\sqrt{m(x^n) \cdot m(x^c)}} \right)$ where the first and the second terms are strictly positive and the third term is strictly negative, since we assumed $m(x^c) > m(x^n)$. Thus, $\frac{\partial \Delta_{e^*}}{\partial \iota} < 0$, which corresponds to statement (ii). Statement (iii) can be shown in analogy. □

When we test these hypotheses empirically, we propose that a high information level as well as utility in the form of rent-extraction potential are related to the development level of the constituency.[16] Results (i)-(iii)

[16] Rent-seeking of politicians in power is by no means limited to developing countries. For instance, see Kauder and Potrafke (2015) for a documented case of rent extraction on the part of elected members of parliament in the German state of Bavaria.

of Proposition 2 can be interpreted as follows. In constituencies with a low development level, criminal incumbents put considerably less effort in political work than non-criminals. It is not implausible that criminal incumbents derive a higher utility from holding office in electoral districts that are economically more developed, because these offer a greater potential for rent extraction (cf. Fisman et al. (2014), who document the growth in incumbents' assets while holding office).[17] Thus, as the development level increases, the criminal MP's effort level converges to that of a non-criminal MP.

To summarize, the model allows us to shows under relatively mild and general assumptions if and why an MP's criminal background can relate to their chosen effort level, by taking account of re-election concerns and incorporating informed and non-informed electorates. Building on previous models ensures comparability to existing work. We derived that criminal types should on average exert less effort. In addition, the model suggests that a higher share of politically informed voters increases the incentives to engage in effort for all types of incumbents which should narrow the gap. For our empirical application, the model thus provides useful guidelines for the selection of variables and directly testable hypotheses.

4 Data and empirical strategy

We use various data sources to construct a constituency-level data set for the 14^{th} Lok Sabha legislative period. We focus on the 14^{th} (2004-2009) instead of the 15^{th} Lok Sabha (2009-2014) or a combination of both because a delimitation commission changed the electoral boundaries of constituencies between the 14^{th} and 15^{th} Lok Sabha elections in 2002, which makes it impossible to match constituencies. Using the 14th Lok Sabha allows us to control for confounding factors such as past electoral performance. This section describes our proxies for the effort level chosen by the incumbent MP, our measure for whether an MP is of the criminal type, as well as the proxies for electoral competitiveness, monitoring intensity and candidate characteristics (Table 1 provides descriptive statistics). We use two different measures to gauge MPs' parliamentary performance, and one indicator to assess constituency development (proposed by Keefer and Khemani (2009)). All three have the advantage that they can be directly attributed to actual MP effort.

4.1 Dependent variables:

i) Attendance rates and parliamentary activity

The most obvious measure of MP effort is *attendance rates* in parliament. This measure has several advantages. First, it is easily quantified and clearly interpretable. Second, it has been widely used in the literature, for example in Gagliarducci et al. (2010, 2011) and Besley and Larcinese (2011). Mocan and Altindag (2013) and Fisman et al. (2014) use it as their main measure of effort in studies on MPs in the European parliament. To avoid confusion, note that some papers use the absenteeism rate instead, which is of course simply the inverse of our measure. Our variable *attendance rate* is scaled between zero

[17] We have not modelled this explicitly, since the implications are obvious. The reasoning is as follows. Suppose that U depends on personal characteristics x and on the normalized GDP of the constituency $g \in [0, 1]$ such that $U_g(x_n, g) = 0$ and $U_g(x_c, g) > 0$. Then, by the first-order condition of equation (1), the higher g is, the higher the effort of a criminal MP.

and one. The lowest rate is 6% for former prime minister Atal Bihari Vajpayee from Uttar Pradesh, who has no criminal background, but was already 76 years old at the date of election. The highest rates are 96% for two MPs from Bihar and Manipur, both without any criminal charges against them. The simple correlation between *Criminal(a)* and *attendance rate* is -0.14.

Though *attendance rates* as a measure has many benefits, it does not necessarily correlate with an MP's work attitude and intensity once they are actually present. Therefore, we complement our analysis of MP effort by including a second measure of MP *parliamentary activity* within the parliamentary sessions in the 14^{th} Lok Sabha period. The literature has for example suggested using speeches, oral contributions and private initiatives (cf. Arnold et al., 2014) or the number of questions asked (Mocan and Altindag, 2013). We combine two categories, the number of questions asked and the number of debates in which MPs have participated, into one indicator named *parliamentary activity*.[18] It is more likely that voters receive a signal, whether it be via personal investigation or via the media, about the average effort invested into activities by their MP. Hence, an overall indicator is better suited to capture the total effort exerted by an MP inside the parliament and proxy the effort level observed by the voters. We normalize each indicator by dividing it by its standard deviation to achieve comparability, and then take the simple average. This aggregate indicator ranges between 0 for nine MPs who have neither asked any questions nor participated in any debate, to 5.03 for C.K. Chandrappan from Trichur constituency in the state of Tamil Nadu, who asked 415 questions and participated in 113 debates during the period covered by our data. There is no obvious correlation between *parliamentary activity* and criminal type, the simple correlation with *Criminal(a)* is a mere 0.003. The data for both *attendance rate*s and parliamentary activity exerted by MPs is taken from the Association for Democratic Reforms (ADR), an independent body that researches Indian elections which was established in 1999.[19].

ii) MPLADS utilization rate

Our third dependent variable is intended to capture MPs' efforts in developing their respective electoral constituencies.[20] We follow Keefer and Khemani (2009) who use utilization of Member of Parliament Local Area Development Scheme (MPLADS) funds meant for development of MPs' constituencies. Introduced in 1993, each MP can receive about 10 million Indian rupees (about 160,000 $US) annually to spend on developmental activities or on local public works recommended by the MP of that constituency. In 1998, it was increased to 20 million Indian rupees. Any unspent money under the MPLADS fund accumulates and is carried forward to the next fiscal year until an MP leaves office. The new MP representing that constituency will inherit the total unspent amount under MPLADS.

The utilization of funds from the MPLADS is a particularly well-suited proxy for the actual effort exerted

[18] We do not use the proposition of private member bills. In the Indian parliamentary system any MP not acting on behalf of the government or political party can introduce a bill in the parliament with the permission of the speaker of the house. The speaker, in consultation with the leader of the house (i.e. the Prime Minister), allots two and half hours on every Friday in each of the parliamentary sessions to discuss the private bills proposed by the MPs. So far, 14 private members bills have been passed in Indian parliament. All of these bills were passed before 1970. Since 1970, not a single private members bill has been passed. During the 14^{th} Lok Sabha period a total of 300 private members bills were moved by various MPs, of which a mere 4% were actually discussed (see Kumar 2010).

[19] ADR is collecting relevant details about candidates contesting both national and state-level elections in India. See: http://adrindia.org/research-and-reports/election-watch

[20] Note that electoral constituencies in India do not overlap with districts' boundaries in the states. There is no easily applicable procedure to aggregate districts up to constituencies.

by an MP to develop her constituency for several reasons. First, it is noteworthy that the amount (20 million Indian rupees) allocated to each MP every year is independent of an MP's constituency and its economic ressouces; and hence provides the same initial conditions to all MPs. Utilizing these funds to develop the constituency is thus purely the responsibility of the respective MPs, as they must identify and initiate the public works which are of highest importance for the development of their constituency . MPs themselves need to personally exert considerable effort to conduct these developmental works: they must work in tandem with various government bureaucrats at the national and state level to first identify viable projects and then obtain permissions and sanctions for the work and monitor the work once the project is undertaken. Second, the MPLADS permits MPs to take clear credit for the public works projects undertaken as a result of this scheme. This provides incentives for MPs to make use of this scheme as part of their re-election strategy. Third, Keefer and Khemani (2009) describe that from the early 2000s on, voter awareness of the MPLADS reached a level high enough to make our assumption of a significant share of informed voters that are aware of their MP's effort as demonstrated by their use of the scheme credible. MPLADS utilization is hence a measure of MP effort that, unlike consumption (Chemin, 2012) and nighttime light intensity (Prakash et al., 2014), can directly be traced back to the MP's actions.[21] Information costs are much lower than for the other two dependent variables. This leads us to expect a smaller or no further interaction effect with the monitoring variables.

We follow Keefer and Khemani (2009)and use the cumulative utilization rate, which is the actual spending incurred by an MP in her constituency as a percentage of the total amount released under the MPLADS each year during the 14$^{\text{th}}$ Lok Sabha period. Unfortunately, the data on actual spending under MPLADS are not publicly available for the year 2005. Thus, our cumulative utilization rate includes the data from 2006 to 2008. We obtain the data on the MPLADS funds from the annual reports on the MPLADS published by the Indian Government's Ministry of Statistics and Program Implementation.[22]

The distribution of the dependent variables deviates from a normal distribution to some degree (see Appendix Figure 1, all appendix figures in Appendix B). We will thus replicate our baseline models with the propensity score matching estimator, which requires fewer distributional assumptions. Potential severe outliers might in particular be very high values in *parliamentary activity* and *MPLADS utilization*. We hence also re-estimate our models without these potential outliers in the robustness section.

4.2 Variable of interest

Our key independent variable is the criminal background of MPs. With the Supreme Court's 2003 order, all candidates contesting state or national elections in India are required to submit a sworn affidavit detailing their criminal background to the Election Commission of India. These are available to voters on

[21] For more details on MPLADS, see: http://mplads.nic.in/welcome.html, accessed between March and November 2013). A much more detailed description of the advantages as a proxy for effort is provided in Keefer and Khemani (2009).

[22] See: http://mplads.nic.in/Annualreportmenu.htm, accessed between March and November 2013). Note that the actual spending incurred by an MP includes any unspent amount which is inherited from her predecessor. We will demonstrate later the different initial inheritances do no bias our results. While there are some reports about corruption in MPLADS spending, there is no evidence of systematic mismanagement. Keefer and Khemani (2009) provides a more detailed explanation why the MPLADS is a particularly good measure of effort as well as additional background information.

the Election Commission's website.[23] They provide information about the number and types of criminal accusations against a candidate. If candidates or MPs are convicted of a crime, they are no longer allowed to run for office, and thus not contained in our sample. We make use of this information to create a binary variable *Criminal(a)* which takes the value of 1 if an MP has any accusation against them and 0 otherwise.

Our aim is to measure the criminal type of an incumbent. Criminal charges provided in the affidavits constitute a good, but imperfect proxy. First, some of the cases registered against the candidates could be politically motivated.[24] However, Vaishnav (2011) argues that information disclosure about criminal charges is obligatory only if the judge deems the charge worthy of a criminal proceeding after a thorough investigation by the local police. Second, candidates may under-report their criminal charges. Still, the potential political costs of under-reporting are high as if they are discovered they run the risk of opposition parties using their omissions as the fuel for a smear campaign or being prosecuted and disqualified from being a member of parliament. Still, while we want to identify the MP's true type CR^*, we observe only the affidavits, which represent a noisy signal $CR = CR^* + u$. Measurement error in CR would attenuate its coefficient, i.e., bias it towards zero.

To avoid such problems we also code a variable *Criminal(b)* that only takes the value of 1 if an MP has more than one charge against him. This alleviates concerns about mistaking innocent MPs for criminals insofar as it is less likely that all charges are unfounded. Also, for some of the accused MPs, their illegal activities might have been a one-off mistake. *Criminal(b)* is more likely to capture "real" criminal types. The main advantage of this coding approach is its simplicity and its objectivity compared to subjectively rating the relative severity of crimes (See Appendix Table 1 for frequencies and details).[25]

MPs with criminal accusations against them are not a phenomenon bounded to few states or certain parties. Table 2 shows that all parliamentary parties are comprised of some criminal members. The share is highest for Rashtriya Janata Dal, a party most prominent in the state of Bihar, with 10 out of 21, or 47.6%, of members being accused of criminal activity. Of the other major parties, the shares range from 15.6% for Indian National Congress to 21% for the Bharatiya Janata Party. The geographic distribution is

[23] See: http://eci.nic.in/eci_main1/LinktoAffidavits.aspx and http://eci.nic.in/archive/GE2004/States/index_fs.htm, accessed between March and November 2013. In some cases it was necessary to manually adjust the spelling of names in the different data sources. This was done by comparing the names with the information available at http://ibnlive.in.com/politics/cand2004.php and adjusting the names accordingly. See Appendix Figure 2 for an example of such an affidavit and detailed information about the data collection process and replication.

[24] While anecdotal, speaking to people who are familiar with the issue or involved in politics gives the clear indication that most charges are indeed justified. The main reasons why so many charges are still pending is the fact that the Indian judiciary system is notoriously overburdened and that it takes years until a specific case is finally dealt with in courts. In some sense, only the slow processing time of the Indian courts allows us to observe these supposedly criminal actors in their parliamentary role. We are not aware of another country with this combination of both a large number of politicians accused of crimes and the general requirement to publish pending criminal charges which take a long time to be resolved. Thus, while we remain cautious with regard to external validity, we hope that our analysis also reveals relationships that could be relevant for other countries but cannot be observed there.

[25] Some crimes could be thought of as more directly related to indicating that an MP will act to the detriment of their home constituency. Crimes related to corruption like accepting bribes might be particularly problematic in a political context. The problem with this is that it is hard to distinguish crimes unequivocally into those relevant for shirking and/or parliamentary performance and those which are not. Murder for example could be related to pure greed or passion, but could also be committed or commissioned to achieve political goals. Within our sample there are not enough cases of crimes that are clearly related to politics like corruption; most crimes recorded in the affadavits are in fact capital crimes. A second difference to *Criminal(a)* could be that *Criminal(b)* captures differences in the abilities of 'criminal' MPs, who must not necessarily form a homogenous group, to intimidate and bribe voters. If the latter group can acquire more voters that way, it is plausible that they would also engage in relatively less effort.

equally dispersed, as can be seen in Figure 1. Most states have at least one and usually more MPs facing criminal accusations. The highest shares in the major states are to be found in Kerala with 36.8%, Bihar with 38.7% and Maharashtra with 46.2%. Assam is the only large state without any such MP, and in general the far east of India seems to be mostly free of MPs accused of criminal activity (See Appendix Table 2 for details).

4.3 Control variables

Our control variables fall into the three categories electoral competitiveness, monitoring intensity and candidate characteristics. A candidate's personal characteristics can affect their individual re-election probability, which relates to the function $m(x)$ in our model.[26] The affidavits also include details about candidates' total assets and liabilities, educational qualifications, age, gender, and experience in parliament. For age, we use MP age at the time of election in 2004. We dummy code the gender variable giving the value 1 if an MP is male, and 0 if female. For education of the candidate, we create an ordinal three category system which assigns a value of 0 if education is not given or indicated as "other" or "literate", 1 if the educational achievement is between the 10^{th} to 12^{th} grade passed, and 2 for all graduate, post graduate or other graduate attainments. For MPs' experience we use a simple count of number of times the MP has been elected in the three elections immediately preceding the 2004 election. It is also a proxy for incumbency advantages or disadvantages, but provides a more nuanced measure of experience which could foster effectiveness in parliamentary work. We calculate net assets as the difference between assets and liabilities, and take the logarithm after adding the minumum net assets plus the value one to all observations to avoid the creation of missing values.

In regards to constituency features related to competitiveness and monitoring intensity (the share of informed voters ι), we first control for voter turnout as a proxy for the extent to which voters within a constituency are interested in and informed about politics. A similar argument holds for literacy rates: Aidt et al. (2015) suggest that illiterate voters might be less put off by criminality and easier prey for vote buying and intimidation tactics. Likewise, it is important to control for the closeness of electoral races in constituencies. We use the winning margin in terms of the difference in the vote share received by an MP and the immediate runner-up in 2004. Keefer and Khemani (2009) argue that this is also a measure of voter attachment to the MP or their party. To address this further, we include a variable capturing whether or not a constitutency is a party stronghold. This dummy takes the value 1 if a candidate belongs to a political party that has won elections in that constituency for the last three successive elections in 1996, 1998 and 1999. We also use a dummy variable for those constituencies which is reserved for candidates from

[26] Please note what it theoretically means to control for candidate characteristics. As outlined in the model, criminal MP's effort can differ due to the reaction of informed voters to criminal background or due to vote-buying. However, there might also be unobserved characteristics that differ between criminals and non-criminals. For example, criminals could differ in their ability, but also simply score higher on a laziness scale (reflected in higher costs of effort in the model). We show results with and without observable proxies for ability and other characteristics. If a potential relationship remains significant conditional on the candidate characteristics we use, the remaining channels that explain this difference could be either the two outlined in the model, or some unobserved difference in character that relates to criminal status. We will further discuss the potential influence of unobserved factors later.

Scheduled Castes (SCs) and Scheduled Tribes (STs). [27]The number of voters is as a proxy for constituency size, which Aidt et al. (2015) relate to the likelihood that a criminal MP can intimidate a significant share of voters.

Finally, we use nighttime lights as a proxy for the economic development of the constituencies. As constituency boundaries do not coincide with the administrative district boundaries there are no official GDP estimates at the constituency level. Henderson et al. (2011), among others, demonstrate how to calculate such a measure and show that it correlates with official GDP growth numbers. Chaturvedi et al. (2011) use nighttime light for a study on income distribution within India, and Baskaran et al. (2015) use it as a proxy for electricity provison. They emphasize that light data have an additional advantage as an objective measure of economic development in countries where official data are either not always available or cannot always be fully trusted. We follow the usual approach and use average visible, stable light on cloud free nights, collected by the F16 satellite for the year 2004.[28] We use the tif-image-file from the National Geophysical Data Center and merged it in ArcGIS with constituency boundaries that were shared by Aidt et al. (2015). We then calculated the log sum of lights using zonal statistics within the constituencies to proxy for economic development. In more developed constituencies voters have better access to media, are more likely to be interested in politics and should hence be more likely to be informed about their MP's performance.

The resulting maximum sample size for our estimations varies between 395 and 439. The first reason for this variation is MPs changing during a term period, the possible reasons for which are manifold: An MP may be promoted to a ministerial or other superior position at the state level, they might make a planned resignation within the period, they could be expelled from office, or they might die. We carefully check each of these cases with information from the election commission of India and exclude all changes.[29] Data on *attendance rate* and *parliamentary activity* are only available in aggregate form over the legislative period, hence comparing MPs with two years in the Lok Sabha to those with four years is misleading. Appendix Table 3 shows that a dummy variable coded one in cases where there was a change is not significantly related to either the *Criminal(a)* dummy or the *MPLADS utilization rate*. Hence, dropping out of the sample is not systematic in a problematic way and hence does not pose a concern for our estimations. The second reason is that for six constituencies the affidavits could not be accessed either due to poor scanning quality or malfunctioning links that could not be repaired. Third, sample size is constrained by our first two dependent variables which are only available for 395 out of the 435 constituencies left in the sample.

[27] In these constituencies, only members of the respective castes and tribes can be elected into office. All data were collected and coded from publicly available sources, mostly the Election Commission of India. Data on partywise competition since 1977 come from http://eci.nic.in/eci_main1/election_analysis_ge.aspx .

[28] For more on this measure, see: http://ngdc.noaa.gov/eog/gcv4_readme.txt. The original description states that "the cleaned up (file) contains the lights from cities, towns, and other sites with persistent lighting, including gas flares. Ephemeral events, such as fires have been discarded and background noise was identified and replaced with values of zero. Data values range from 1-63. Areas with zero cloud-free observations are represented by the value 255". Appendix Figure 3 graphically depicts the geographic variation of economic development in India.

[29] http://eci.nic.in/archive/GE2004/States/index_fs.htm, accesssed between September and December 2014.

4.4 Empirical Strategy

We distinguish between the analysis of the dependent variables related to parliamentary work, *attendance rates* and *parliamentary activity*, and the one relating to *MPLADS utilization*. Both measure slightly different dimensions of MP effort. The former two relate directly to input and effort, whereas the latter also relates to output and MP effectiveness in promoting the development of their constituency. We refer to the dependent variables as Ef_i, the effort of the MP in constituency i.We aim to measure the Treatment effect on the treated (TOT), where treatment consists of the MP being of the criminal type ($Criminal(Cr) = \{0, 1\}$). Clearly, the observed differences in the data might capture the TOT but be affected by selection bias.[30]

$$E[Ef_i|Cr_i = 1] - E[Ef_i|Cr_i = 0] \qquad =$$

$$\overbrace{E[Ef_{1;i} - Ef_{0;i}|Cr_i = 1]}^{ATET} + \overbrace{E[Ef_{0;i}|Cr_i = 1] - E[Ef_{0;i}|Cr = 0]}^{SelectionBias}$$

The coefficients related to *attendance rates* and *parliamentary activity* as proxies for Ef_i would be upward biased, for example, if constituencies that are more likely to elect a criminal are also those that engage in less monitoring of MP activities. Upward biases ($\mathrm{E[Ef_{0;i,t}|Cr_i = 1]} - E[Ef_{0;i}|Cr = 0] > 0$) would also occur when certain constituencies are both more likely to elect a criminal MP and have higher MPLADS utilization rates. For example, poor constituencies with a lower information level could be more likely to elect a criminal MP, and at the same time it is easier to think of and recommend a project in a less developed environment. In this case, our estimates would be biased against finding a negative effect of *Criminal*. Downward bias ($\mathrm{E[Ef_{0;i,t}|Cr_i = 1]} - E[Ef_{0;i}|Cr = 0] < 0$) is possible if it would, for instance, be harder to find and develop projects in constituencies that are more likely to have a criminal MP.[31]

Our first attempt to avoid selection bias is, as usual, by carefully selecting an extensive set of control variables and relying on the conditional independence assumption. In doing so, our theoretical model provides guidelines as to the areas from which to select relevant control variables. We estimate

$$Ef_i = b_0 + Cr_i b_1 + X_i^{'} b_2 + S_s + P_p + \varepsilon_i$$

where Ef_i indicates effort in one of the three dimensions in constituency i, *Criminal*(Cr_i) is our dummy for whether the MP has a criminal background, X_i is the matrix of control variables in the three categories

[30] Biases could potentially exist if having a criminal type MP and political effort or outcomes are simultaneously determined equilibrium outcomes. We are not explicitly modeling this, but Aidt et al. (2015) and Dutta and Gupta (2012) explain the underlying dynamics in more detail. Our aim is to assess how likely it is that these potentially disturbing factors affect our estimations and in which direction. We will also show how large this selection-on-unobservables would have to be to account for our estimated coefficients.

[31] Note that the MP's effort in the parliament should not be affected by the time spent on preparing for the court cases. The Indian judiciary system allows those accused of a crime to appoint a lawyer (either public prosecutor or a private lawyer) to defend her case in the court of law. This effectly means the accused need only be available in the court of law on certain important matters such as being directly questionedor on the day the verdict is pronounced.

electoral competitiveness, monitoring intensity and candidate characteristics as specified above, and S_s and P_p are dummies for states and parties respectively. We follow Keefer and Khemani (2009) and use dummies for all major states. As outlined above, criminal MPs are found all across India, but some of the larger states obviously exhibit a higher percentage than others. With the fixed effects we make sure our results are not caused by unobservable, time-invariant factors that are specific to, for example, Maharashtra which has the highest share of MPs with criminal charges. With regard to parties, we choose to employ party dummies as additional controls for all parties that are comprised of twenty or more MPs. As mentioned above, the distribution of MPs by party and the respective share of *Criminal* is provided in Table 2.

While we demonstrate in our model that it is not obvious that MPs with criminal charges actually execute less effort than others, the press coverage, as well as public opinion and existing research, suggest a negative coefficient for *Criminal*. If this a priori assumption is true, we would be less concerned about a possible upward bias in the coefficient of *Criminal* ($\mathrm{E}[\mathrm{Ef}_{0;\mathrm{i}}|\mathrm{Cr}_{\mathrm{i}} = 1] - E[Ef_{0;i}|Cr = 0] > 0$). Our estimates would then pose an upper bound of the (more negative) causal effect. We will show various pieces of econometric evidence in the analysis that suggest upward bias is more likely than downward bias.

We use cluster-robust standard errors that allow arbitrary within-cluster correlation. With regard to parliamentary work, correlations between individuals' efforts are arguably most likely within parties. Parties are the natural unit of comparison within a parliament; MPs are, for example seated along with their own party members. Thus, we choose the party level as the clustering unit for the first two variables. For the MPLADS fund, on the other hand, outcomes within states are more likely to be correlated and we cluster on the state level. The implementation probability and effectiveness depends on the individual state, which processes and executes the projects. Some states might, for example, implement the proposals more quickly than others; and differences in ex ante success probability can affect the likelihood of applying for a project. We now turn to our results.[32]

5 Results

5.1 Baseline

Appendix Table 4 depicts the baseline results for the regressions with *attendance rates, parliamentary activity* and *MPLADS utilization* as dependent variables. All regressions contain state dummies and dummies for the major national parties. Dummy coefficients are not displayed to improve clarity and

[32] The number of clusters, 42 parties for parliamentary work and 33 states for the MPLADS fund, should be sufficiently high not to suffer from 'few cluster' inference problems. Our main results are virtually unchanged when clustering on either state or party. Recently, MacKinnon and Webb (2015) also suggested that inference might be affected by wildly different cluster sizes. We programmed a cluster wild bootstrap procedure based on the suggestions in their appendix and their derivations in Cameron et al. (2011). To generate the bootstrap dependent variables we used the "Rademacher" 2-point distribution as well as the "Webb" 6-point distribution. The results with 10,000 repetitions mostly confirm the findings with more standard procedures. *Attendance rates* remains significant with *Criminal (a)* (Rademacher p-value=0.066/ Webb p-value=0.063) and *Criminal(b)* (Rademacher p-value=0.009/ Webb p-value=0.010), and *parliamentary activity* remains insignificant. The only difference is for MPLADS utilization rates, where *Criminal(b)* becomes marginally insignificant (Rademacher p-value=0.139/ Webb p-value=0.125).

readability. *Attendance rates* ranges from 0.06 to 0.96, *parliamentary activity* from 0 to 4.38 and *MPLADS utilizatio*n from 60 to 260.

First, let us briefly consider *attendance rates* . The omitted reference category for the major party dummies are other or non-national party MPs. Positive relationships with *attendance rates* compared to this reference category can be seen for the "Indian National Congress" and the "Samajwadi Party", both significant at the 1%-level. For *parliamentary activity* the positive effect of "Indian National Congress" disappears and we observe a negative relationship with being a member of the "Communist Party of India". It is positively related with the "Rashtriya Janata Dal" and the "Samajwadi Party". The only significant party for *MPLADS utilization* is a negative relationship to the "Indian National Congress". The remaining correlations can be seen in the table and are not discussed here; generally most significant relationships with control variables occur with *attendance rates*.

5.2 Parliamentary Work

Table 3 displays the relationship between our main variable of interest and *attendance rates*. *Criminal(a)* has a coefficient of -0.046 which is significant at the 10%-level in column 1, when controlling for state and party dummies only. The coefficient becomes slightly more negative in columns 2 and 3 when we add controls for electoral competitiveness and monitoring intensity, and significant at the 5%-level. This indicates that omitting the two categories leads to a slightly upwardly biased coefficient. The coefficient changes marginally to -0.043 when including candidate characteristics, and remains significant.

The results look rather different when it comes to *parliamentary activity*. As the simple correlation suggested, columns 5 to 8 show there is no systematic relationship between *Criminal(a)* and *parliamentary activity*. The coefficient is negative in columns 6 to 8, however, but in every column fails to reach significance. One interpretation is that contrary to public opinion, criminal MPs do not necessarily exhibit less effort in all dimensions. This is in line with our model which demonstrated thata criminal MP's choice of effort level depends on the circumstances and other model parameters. An additional intuitive explanation could be that activity has additional unmeasurable private benefits to both types of MPs, such as, for example, the utility derived from the attention gained when speaking in front of the parliament.

Using our alternative and more stringent measure *Criminal(b)*, which should alleviate measurement error problems in identifying criminal types, confirms and strengthens the existing results. For *attendance rates*, the coefficient for *Criminal(b)* increases in absolute size from about -0.05 to about 0.13, relating to 13 percentage points lower *attendance rates* for those with a criminal background (column 9-12). This effect is significant at the 1% level. Similarly, the coefficient for *parliamentary activity* becomes more negative, but is still relatively far from being significant (column 13-16). These two results would be in line both with measurement error in identifying criminal types and a scenario where the severity of criminal background relates to bigger differences between criminals and non-criminals. A classification of crimes is in our opinion highly arbitrary and the consequences of committing different types of crimes is theoretically unclear. Instead, we used the number of crimes and its square term instead of the dummy and find that there is no u-shaped non-linear relationship that would suggest more crimes generally translate intoexerting less and less effort . Thus, the data suggest that the more robust effect for *Criminal(b)* is due to the fact that it identifies criminal types more precisely. In conclusion, we find a generally negative and significant relationship between *Criminal* and *attendance rates*, and a negative but insignificant relationship to *parliamentary activity.*

We further want to test whether the effect of *Criminal* is moderated by monitoring (economic development and literacy rate), as suggested by our theoretical model, and competitiveness (party stronghold and winning margin). We hypothesized that a high degree of information and hence monitoring of MP activity has a moderating effect, as a criminal MP who would normally exert less effort might not do so when the negative impact on her chances for re-election is sufficiently high. Competitiveness on the other hand should not have a significant moderating effect, as it affects criminals and non-criminals alike. Economic development proxies for both access to media and information about candidate performance, and for the average voter's interest in MP effort. An MP that shirks is more likely to experience negative consequences in constituencies with a ι, relating to intense monitoring with better informed voters who are more interested in their MP's performance. To test these hypotheses, we interact *Criminal(a)* with party stronghold, winning margin, economic development and the literacy rate.

Table 4 shows the coefficients for *Criminal(a)* and the respective interaction. All other variables are included but not displayed in the table. The results for both dependent variables show no significant interaction effects with party stronghold and margin (2004), as expected, but also none for literacy rate. However, the interaction effects between economic development and *Criminal(a)* are positive and significant at the 1%-level for both *attendance rates* and *parliamentary activity.* Drawing on our model, the most likely explanation is that more developed constituencies monitor their MPs more closely, which results in a higher share of informed voters who are able to punish shirking. An alternative explanation within our model framework, which is supported by anecdotal evidence, is that part of an MP's utility can come from rent extraction (cf. Fisman et al., 2014 and Kapur and Vaishnav, 2011). If more developed constituencies offer better rent-seeking opportunities for criminal MPs, this increases their utility from re-election, and can also narrow the effort gap between criminal and non-criminal types as criminal types strive to maintain access to this resource.

Figures 2 and 3 illustrate the moderating effects. The y-axis displays the effect of *Criminal(a)* on effort with its 95% confidence-interval conditional on economic development, which is plotted on the x-axis. The marginal effect of *Criminal(a)* is negative and significant for low levels of economic development for *parliamentary activity,* respectively for low and median levels for *attendance rates.* These are constituencies where intense monitoring of MPs effort and access to such information is limited, with on average less resources and wealth. For highly developed constituencies there is no significant difference between MPs with and without criminal charges, a result that is in line with our model.

The insignificance of the interaction with literacy rates, which also proxies for monitoring, suggests that rent-seeking rather than monitoring explains the varying effort levels between criminals and non-criminals. Further tests revealed that the interaction with economic development remains significant, even when controlling for literacy rates, while the interaction with literacy rates remains insignificant even when omitting economic development. Thus, the more plentiful rent-seeking opportunities that more developed constituencies possess counter-intuitively contribute to narrow the effort gap to non-criminals: criminals work relatively harder when there is a chance for a larger reward.

5.3 Member of Parliament Local Area Development Scheme (MPLADS) utilization rate

Now we turn to *MPLADS utilization*, which as Keefer and Khemani (2009) argue offers several advantages as a measure of MP effort. The baseline model specification is identical to the one for the first two indicators, except that standard errors are now clustered at the state level to allow for arbitrary correlation within states. As implementation of the project depends on the state bureaucracies, correlation within states is most likely. Our results are, however, unaffected by alternatively clustering on parties. Columns 1-4 in Table 5.1 show the results for *Criminal(a)* and columns 5-8 for *Criminal(b)*. Columns 1 and 5 only use party dummies, columns 2 and 6 add the electoral competitiveness controls and party dummies, columns 3 and 7 the monitoring intensity controls, and columns 4 and 8 the candidate characteristics.

For our variables of interest, the coefficient on *Criminal(a)* is negative, but remains insignificant in columns 1-4. The coefficients barely change when adding the controls, becoming slightly more negative in column 4 compared to column 1. Thus,we cannot reject the hypothesis that candidates with criminal charges against them generally perform equally well in terms of making use of the development fund scheme. As mentioned above, one concern about these results, however, could be whether the existence of any charge correctly identifies criminal MPs. We again use our *Criminal(b)* measure to alleviate these concerns. Columns 5-8 show the results when using the alternative measure. *Criminal(b)* is related to lower utilization rates in all specifications, significant at the 5%-level. This holds when adding the controls: the coefficient becomes slightly more negative from -5.080 in column 1 to -7.723 in column 4. This coefficient translates to about 7.5 percentage points lower cumulative utilization rates over the legislative period.

The obvious question is whether this relationship has a causal interpretation, or if the coefficient is biased upwards or downwards. In our model with two types of fixed effects, identification relies mostly on within-state, within-party variation. Hence, the results should not be driven by the geographic or political distribution of criminal MPs. Nonetheless, the coefficient might be biased if there are unobserved variables that vary within states or parties and are related to characteristics that affect MPLADS spending. One possibility is, for example, that constituency-specific characteristics like differences in the level of economic development make it easier (or harder) to utilize available MPLADS funds. We can compare the results with and without control variables to get a first indication of the direction of a potential bias. The idea is similar to Altonji et al. (2005): we use selection on observables to assess the effects of selection-on-unobservables. When adding controls X_i, i.e., controlling for selection on constituency and candidate observables, the coefficients in Table 5.1 becomes markedly more negative compared to columns 1 and 4 when adding more controls. This shows first that the coefficient is barely affected by observable selection effects. In addition, if omitted variables bias in terms of selection-on-unobservables works in the same direction as selection on observables, the negative coefficient will be an upper bound estimate of the true causal effect.

Let us briefly elaborate on this argument. Assume the true regression is $Ef_i = \beta_0 + \beta_1 Cr_i + \beta_2 X_i^* + \varepsilon_i$. If we estimate unconditionally $Ef_{i,s} = b_0^U + b_1^U Cr_{i,s} + \varepsilon_{i,s}^U$ instead, where the superscript U stands for the unrestricted model, our coefficient is biased: $b_1^U = \beta_1 + \beta_2 \frac{Cov(C,X^*)}{Var(C)}$, where the second term indicates Omitted Variable Bias (OVB). Now assume our proxies for the three categories that are contained in the matrix of control variables X_i do not capture the true X_i^*, but $X_i = X_i^* + u_i$. For example, it is reasonable to assume that our proxy for economic development is a noisy measure of the true development level. Following this, the restricted model with controls then is $Ef_i = b_0^R + b_1^R Cr_i + b_2^R X_i + \varepsilon_i^R$. We know that measurement error does not affect the covariance of X_i with Cr_i, but it will underestimate the relation between X_i and Ef_i, hence $b_2^R < \beta_2$. Accordingly, positive OVB ($b_2 \frac{Cov(C,X)}{Var(C)} < \beta_2 \frac{Cov(C,X^*)}{Var(C)}$) occurs for $\beta_2 > 0 \wedge Cov(C,X) > 0$ and negative OVB ($b_2 \frac{Cov(C,X)}{Var(C)} > \beta_2 \frac{Cov(C,X^*)}{Var(C)}$) for $\beta_2 < 0 \vee Cov(C,X) > 0$).

How does this help our interpretation? Generally, we are less concerned with OVB when it works against the direction of our estimated coefficient, i.e., a positive bias with a negative coefficient and vice versa. In the case of MPLADS, our $\beta_1^U < 0$ (column 1), and $\beta_1^R < \beta_1^U$ (column 4), which suggests a positive bias. We can now reason that even if our empirical proxies only capture the underlying parameters with random measurement error, it holds that $b_1^U < b_1^R < \beta_1 \; \forall \; \beta < 0, b < 0$, i.e., the negative coefficient b_1^R that we report is an upper bound estimate. The assumptions in this consideration are that we have indeed identified the relevant categories in our theory, and that measurement error is random.[33] If our model failed to identify the relevant control categories, selection on other unobservable factors could still be relevant. For this reason, we will conduct further robustness tests for all dependent variables in the next section.

Another way to assess omitted variables is to add the cumulative utilization rate in the previous period to the equation. As constituency delimitation did not change between 1999 and 2004, this lagged dependent variable should capture time-invariant omitted factors, i.e., work similar to a constituency-fixed-effect. The coefficient of *Criminal(b)* in column 1 in the second part of Table 5.2 remains virtually unchanged, giving no indication of such a bias. As another possibility, we consider whether leftover funds from predecessors bias the coefficient. The terms for using the MPLADS funds state that unused resources can be carried over to the next year(s). Higher leftovers increase the overall amount of available money and could bias the measured degree of utilization upwards in cases where there are systematic differences across constituencies. While theoretically plausible, this either does not play a large role in reality, or does not vary systematically between candidates with and without criminal charges, as the coefficient again remains nearly unchanged in size and significant at the 5%-level (column 2).

In addition, we follow the robustness checks in Keefer and Khemani (2009) and test whether political and social fragmentation, as well as electoral volatility in the constituency influence the coefficient (columns 3-5). The original data source for the first two measures is Banerjee and Somanathan (2007). They argue that political fragmentation may reflect greater electoral competitiveness, which as we derived in our model can affect an MP's effort. The measure is defined as $1 - \sum_{p=1}^{N} \mu_{p,i}^2$, where $\mu_{p,i}$ is the vote share of the p^{th} political party contesting the election in the given constituency i, which is then averaged over the 1991, 1996, 1998 and 1999 elections. Social fragmentation might be relevant if it reduces the provision and changes the composition of local public goods within constituencies. We use a measure of caste and religious fragmentation, based on the census of 1991. Keefer and Khemani (2009) also argue that electoral

[33] The argument holds for a negative estimated coefficient even with systematic measurement error as long as β_2 and $Cov(C,X)$ do not change signs. Even if X systematically under- or overestimates X^*, it follows from $b_1^R < b_1^U$ that $b_1^U < \beta_1 \; \forall \; \beta, b < 0$. Accordingly the negative b_1^U is the upper bound estimate. b_1^U is also negative and significant in the case of *Criminal(b)*, which suggests that the true effect is negative as well. For simplicity other covariates were disregarded here; however, their inclusion would (under standard assumptions) not affect the results . The argument cannot be applied for the estimated coefficients on *attendance rates* and *parliamentary activity*, where selection on observables does not clearly indicate a direction of OVB.

volatility can be related to MP behavior, as in constituencies where voters are prone to greater shocks and a more insecure environment, the expected returns to MP effort should be lower. As in their study, we use a measure from Nooruddin and Chhibber (2008) that defines volatility as $\frac{1}{2}\sum_{p=1}^{N} \mid \mu_{p,i,t} - \mu_{p,i,t-1} \mid$, i.e., the sum of the changes in vote shares of N political parties. This is again averaged over the four previous elections. All three measures might lead to omitted variable bias if they are related both to MPLADS spending and to the likelihood of having a criminal MP. However, this does not seem to be the case. The coefficient of *Criminal(b)* remains negative, nearly unchanged in size, and significant in all specifications (column 2-6). Even when we control jointly for all three variables from Keefer and Khemani (2009), the cumulative utilization rate in the previous period and leftover funds from predecessors, the coefficient remains stable and significant at the five percent level. *Criminal(b)* is related to about 7.6 percentage points lower utilization rates.

It can be seen in the Violinplots for all dependent variables in Appendix Figure 1 that the distribution of the utilization rate exhibits some potential outliers in its right tail. To make sure these do not distort our results, column 7 of Table 5.2 drops the ten constituencies with the highest utilization rates that constitute this tail. The coefficient becomes somewhat smaller in absolute size, but remains significant. Finally, we compare *Criminal(b)* only to the MPs without any charge at all, i.e., those who are most likely not of the criminal type. As we would expect, this leads to a larger negative coefficient which also remains significant at the 5%-level. Thus, we conclude that there is a negative relationship between criminal background and development fund utilization, which is significant for those MPs with at least two criminal charges, and unlikely to be explained by selection or omitted variable bias.[34]

5.4 Identification of causal effects

This section use alternative and additional econometric models for all dependent variables and discusses whether the estimated coefficients capture the causal effect of criminal type. First, we employ propensity score matching techniques as an alternative estimator to examine whether this affects our results. Second, we analyze whether the results are driven by extreme values or outliers. The results in Table 6 mostly confirm our above result, however they suggest a stronger negative relationship between criminal MPs and effort.

So far, we have relied on a regression framework to examine our hypotheses, while matching criminal to non-criminal MPs seems to be an intuitive alternative to assess the treatment effect on the treated. Angrist and Pischke (2008) argue that OLS regressions are a natural starting point for empirical studies. Propensity score matching has advantages but requires many somewhat arbitrary choices which can greatly affect results; and in cases where both are consistent, OLS is more efficient. Using matching as a robustness check has two advantages. First, it allows us to compare our regression estimates to those from matching the MPs with a criminal background (treatment group) to those without (control group). This is interesting as the weights differ between the two estimators: OLS assigns the highest weights to the observations with

[34] As expected, there are no significant interaction effects with monitoring intensity. Appendix Figure 5 shows that there is a positive, but insignificant relation with economic development. This supports our hypotheses from the model: We would expect the share of informed voters to matter only if there are noticeable information costs and a larger enough share of uninformed voters.

the largest conditional variance of the treatment status, whereas matching assigns the highest weight to those observations that are most likely to be treated. Second, we assess the reliability of our estimates by using matching diagnostics to examine how well the treatment and control groups are matched.

We use nearest-neighbor (NN) matching with the Mahalanobis distance-metric and robust standard errors (Abadie and Imbens, 2009). As NN-matching estimators were shown to be inconsistent when matching more than two continuous covariates, we use the consistent bias-corrected estimator as outlined in Abadie and Imbens (2006, 2011), which uses a linear function of all covariates as a correction term. We show results for the average treatment effect on the treated when matching to the two and three nearest neighbors. In our case the choice of three offers the lowest median bias in covariate balancing. Covariate balancing seems to be achieved overall: There are no significant differences in the means of any covariate except education which is higher for non-criminal candidates (details in Appendix Figure 4). If higher education would be related to easier usage of MPLADS funds, for example, this could affect our estimates. However, matching exactly on education level does not alter any of our results (results available on request).

In a nutshell, the results using matching estimators confirm the regression results both in direction and significance. Column 1 in Table 6 shows that the negative relationship for both *Criminal(a)* and *Criminal(b)* with *attendance rates* becomes stronger but similar in size to the regression results and is significant at least at the five percent level in all specifications. Column 2 confirms that *parliamentary activity* is not generally affected by criminal background. Column 3 for *MPLADS utilization* points in the same direction: the estimated coefficients become more negative. With matching, the negative coefficient of *Criminal(a)* becomes significant at conventional levels when matching to the two nearest neighbors. *Criminal(b)* remains significant, now at the 1%-level, with a more negative coefficient that is again more negative than *Criminal(a)*.

We have already used selection-on-observables to argue why selection bias is less of a concern for the relationship with MPLADS utilization under relatively mild assumptions. Due to the different direction of selection-on-observables, the same argument does not hold for the first two dependent variables. If we do not fully capture the difference in competitiveness and monitoring between those constituencies with and without a criminal MP, unobserved factors could affect the estimates for *attendance rates* and *parliamentary activity*. Theoretically, we would want an instrument that affects the treatment, i.e., the selection of a criminal MP, but is not related to MP effort. One possible instrument is to use the existence of other criminal candidates in the same constituency in the 2004 election. Dutta and Gupta (2012) find that the fielding of such candidates by other political parties attenuates the stigma associated with having a criminal background. This would not directly affect incumbent effort if the criminal candidates were not relevant for the final outcome of the election. A crude test of exogeneity shows that it is not significant in the main equation conditional on the other variables in X_i. The instrument would be significant in the first stage, but the F-statistics are comparatively small and the Kleibergen-Papp rk LM and F-statistics do not confirm the validity of the model. This is why we refrain from using an IV strategy.[35]

Instead, we further investigate potential selection issues by using so-called endogenous binary-variable models (treatment effect models). The approach of these Heckit-models is similar to Heckman selection-models: The selection problem is approached by explicitly modeling selection instead of only proposing a supposedly exogenous instrument. Treatment effect regression differs from sample selection models as the dummy treatment variable is directly entered in the regression equation and the outcome variable is observed for both the treated and the untreated subjects. The advantage of this potential outcome model is that it provides information about the effects of non-linear selection bias.

Specifically, we model two equations. Our simplified regression equation is $Ef_i = Cr_i b_1 + X_i^{'} b_2 + \varepsilon_i$ where X_i contains the controls and fixed effects and Cr_i is the dummy treatment indicator. Our probit selection equation estimates the latent variable $Cr_i^* = Z_i^{'}\nu + u_i$, with $CR_i = \left\{ \begin{array}{ll} 1 & \text{if } CR_i^* > 0, \\ 0 & \text{if } CR_i^* \leq 0 \end{array} \right\}$ and $Prob(Cr_i = 1 \mid Z_i) = \emptyset(Z_i^{'}\nu)$, respectively, $Prob(Cr_i = 0 \mid z_i) = 1 - \emptyset(Z_i^{'}\nu)$. Z_i is a row vector of variables determining the selection process and ε_i and u_i are assumed to be bivariate normal with zero mean and covariance matrix $\begin{pmatrix} \sigma_\varepsilon & \rho \\ \rho & 1 \end{pmatrix}$. $\rho \neq 0$ reflects the assumed endogeneity of the treatment, and $\sigma_u^2 = 1$ for identification.

This is a switching regression depending on whether $Cr^* > 0$ or $Cr^* < 0$, with separate forms for the outcome under treatment ($Ef_{i,g} = (Z_{i,g}^{'}\nu + u_{i,g})b_1 + X_i^{'} b_2 + \epsilon_{i,g}$) or non-treatment ($Ef_{i,g} = X_i^{'} b_2 + \epsilon_{i,g}$) regime. For a more detailed description see for example Cameron and Trivedi (2005, sec. 16.7 and 25.3.4) and Maddala (1983). We conduct the estimation using full maximum likelihood under a normal distribution assumption.[36]

We do not claim that this approach resolves all potential selection/omitted variables bias concerns. Contrary to IV, which has to assume no correlation between instrument and error term, we explicitly make an assumption about the outlined correlation structure. The z_i in the selection equation contains all variables in x_i, plus the variable "other criminals" which counts the number of additional criminal candidates in the constituency in 2004. As reported above, *other criminal*s provides plausibly exogenous variation about the selection of a criminal candidate. It did not pass the specification tests in IV regressions, but works well in

[35] Chemin (2012) suggests a regression discontinuity design as an alternative, where he focused on cases where a criminal contested against a non-criminal. We do not use RDD in our main specification for several reasons. First, while the treated and control groups seem to be balanced within a +/-5% vote score difference, the assumption of continuous density in the neighborhood of the discontinuity is rejected by the McCrary-test (McCrary, 2008). Specifically, criminal candidates seem to win close elections much more often than chance would predict, as indicated by the discontinuity's higher density to the right. This apparent score manipulation makes us skeptical about the use of RDD here. Moreover, the number of close races between winner and runner-up is very limited. If we use an already wide bandwidth of 10 (20) percent vote difference, we are left with 31 (62) observations. The interested reader can find the related graphs in Appendix Figures 6 and 7. Graphically, one can spot an obvious discontinuity with regard to *attendance rates* and potentially for *parliamentary activity*: Using a simple specification with a regular and quadratic score variable, the difference between Criminals and Non-Criminals becomes more negative compared to our main model and remains significant at the 5%-level for *attendance rate*. *Parliamentary activity* becomes negative and significant as well.

[36] Alternatively we can regard this model as a non-standard Maximum likelihood estimator. The likelihood function $L_N(\Theta) = f(y, X|\Theta) = f(y|X, \Theta)f(x|\Theta)$ generally would require specifying the conditional density of y given X as well as the marginal density of X. It is standard to use only the conditional density $f(y|X, \Theta)$, and ignore $f(X|\Theta)$. This in essence assumes exogenous sampling and conditional independence. Treatment effects models drop this assumption, but instead assume a specific correlation structure of the error terms of the two equations to be estimated.

this estimation framework.We run the regressions for all three dependent variables. In the results in Table 6 and Appendix Table 6, Lambda is the inverse mills-ratio or non-selection hazard, and the parameter Rho indicates the correlation between the error termsϵ_i andu_i. We test the model assumptions with a likelihood ratio test that compares an independent probit and regression model with the treatment effect model, a test of $\rho = 0$ that is Chi-square distributed. The coefficient for other criminals is positive and significant in the selection equation as predicted and the test statistic rejects the null for *attendance rate* and *MPLADS utilization,* indicating that both models are valid.

Based on that, the results further support our earlier impression that not controlling for selection effects biases the OLS coefficient upwards rather than downwards. The negative relationship between criminal background and *attendance rates* becomes more negative and significant at the 1%-level. The same holds for the relation with *MPLADS utilization*: The coefficient of *Criminal(a)*, which was negative but insignificant in the baseline model, becomes larger in size and significant at the 1%-level. The next rows omit potential extreme values or outliers in the earlier regression specifications in Tables 3 and 4. First, we omit the observations that exhibit the largest values in the respective dependent variables, as the Violinplots indicated some potential outliers. Second, we calculate the residuals of the full regression, and omit the observations with the one-percent largest positive and negative residuals. The results for all dependent variables and both *Criminal(a)* and *Criminal(b)* are unaffected, indicating that the results are not driven by outliers or few observations.

Finally, we want to demonstrate how likely it is that, if all our prior robustness tests that suggest an upward bias failed, our results are explained by selection-on-unobservables. While our attempts so far suggest that selection, if anything, biases against the negative coefficient we measure, we cannot rule out that there are unobservable factors that lead to a problematic bias in the direction of our effect. Thus, we use techniques developed in Altonji et al. (2005) to demonstrate how much larger on average selection bias on unobserved factors would have to be compared to selection on observed factors to fully explain our results.

The strategy is to use selection-on-observables to assess the severity of potential selection bias for the results. We compare two kinds of regressions: first, one without controls (U_1 = unrestricted) to one with our full set of controls (R = Restricted); and second, one with a limited set of controls for fixed effects (U_2) to one with full controls (R). We then calculated a "Selection ratio" (SR), which is the necessary ratio of selection-on-unobservables to observables to fully explain our coefficients as $\hat{\beta}_R/(\hat{\beta}_U - \hat{\beta}_R)$. The denominator, i.e., the difference between the $\hat{\beta}$ coefficients indicates the degree to which our estimate is affected by selection-on-observables. A small difference indicates weaker selection effects. $\hat{\beta}_R$ in the nominator enters positively in the ratio, as we need stronger selection-on-unobservables to explain a larger coefficient. Altonji et al. (2005) provide the underlying assumptions and Bellows and Miguel (2008) a formal derivation.

While our empirical proxies might not perfectly capture the theoretical parameters, they are comprehensive and should be a useful guide to assess selection-on-unobservables. Altonji et al. (2005) posit that "there are strong reasons to expect the relationship between the *unobservables* and (...) generally any potentially endogenous treatment to be weaker than the relationship between the observables and dependent". The bottom part of Table 6 shows the respective ratios for $\frac{\hat{\beta}_R}{(\hat{\beta}_{U1}-\hat{\beta}_R)}$ and $\frac{\hat{\beta}_R}{(\hat{\beta}_{U2}-\hat{\beta}_R)}$, for our two limited sets

(U_1) and (U_2). The results strongly confirm the negative relationship between criminal background and *attendance rates*: Selection on unobservables would have to be at least 3.3 - 3.7 [2.1 - 3.7] times as strong as selection-on-unobservables to fully explain the negative coefficient of *Criminal(a)* [*Criminal(b)*]. To explain the negative relationship between *Criminal*(b) and *MPLADS utilization* rates, selection-on-unobservables would have to be between 11 and 45 times as high as on observables.

Oster (2013) further formalizes and extends these ideas. More specifically, she argues that the extent to which robustness to selection-on-observables confirms our confidence in coefficient stability depends on the degree to which those observables explain variance in the dependent variable. Intuitively, this can be easily understood. We could add additional variables to our regression which are not correlated with either the dependent or our variable of interest. Adding them would not affect our coefficient estimate, however, this would not be very revealing. If additional observable controls explain considerable variation, but do not affect our coefficient by much, we can assume that unobservables are not likely to do so as well. In essence, the beauty of this approach is that it makes selection-bias quantifiable and its (problematic) extent assessable. While experiments are the gold standard due to controlled randomization, the credibility of IV and RDD identification rests solely on the identification assumptions. This might or might not be credible. The reader has to believe in the exogeneity assumption, and in many cases evaluations some years after publication reveal severe problems. This approach, on the other hand, does not claim to solve endogeneity but allows clear and easily understandable numbers that indicate whether bias is problematic for a causal interpretation in each specific case.[37] When applying the suggested assumptions our identified coefficient sets do not include zero for both *attendance rates* and *MPLADS utilization* in any specification. Thus, while we cannot make a causal claim for *parliamentary effort*, the test suggests that selection-bias does not seem to be problematic for a causal interpretation of the other two variables.

6 Concluding remarks

In this paper we examine whether the fact that a member of parliament has a criminal background influences his effort in parliament and in developing his constituency. To be able to understand the implications of criminality on MP behavior, we developed a model that illustrates the incentives faced by elected MPs with regard to the effort they exert. The model incorporates voters' monitoring intensity with regard to parliamentarians' efforts, as well as the competitiveness and other characteristics of their constituencies, to make predictions about the effect of criminal background on individual effort. We show under which circumstances we expect criminal MPs to exert less effort.

The hypotheses derived from the PA-model are then put to an empirical test using data from the 14th Indian 2004 Lok Sabha election, and the subsequent 2004-2009 legislative period. While criminals in politics are a general issue, in India criminal MPs are a widespread phenomenon and widely regarded as a danger to the functioning of the world's largest democracy. This analysis was made possible by a judgment

[37] We also need an assumption about the maximum R-squared that can be systematically explained and is not due to pure noise. Oster (2013) suggests that one should apply the same standard to observational studies that are fulfilled by randomized studies which used control variables and were published in five selected top journals. She calculates that the appropriate R_{max} is 2.2 times theR^2 in the specification with all observable controls. With regard to δ we use the most conservative suggested relation of $\delta = 1$.The formula for the identified set boundary is then $\beta^* = \widetilde{\beta} - \tilde{\delta} \times \frac{(\dot{\beta}-\widetilde{\beta}) \times (R_{max}-\widetilde{R})}{(\tilde{R}-\dot{R})}$.

of the Indian Supreme Court in 2003 which asked every candidate to provide sworn affidavits that had to include details not only about their personal, educational and financial particulars but also about their criminal background. We restrict our analysis to this legislative period because constituency boundaries were changed in the 2009 election. Thus, it is no longer possible to control for important constituency characteristics like the winning margins in previous elections.

We augment the existing literature, which has mostly focused on the initial decision of whether to field a criminal candidate in the first place, as in (Aidt et al., 2015), and on the connection of MP criminality with rather disjointed proxies for MP effort like final consumption in the respective district or constituency as in Chemin (2012) and luminosity as in Prakash et al. (2014). We provide a comprehensive direct assessment of effort by using three measures that each capture a slightly different facet of MP behavior. First, we use *attendance rates* (respectively absenteeism) as for example in Besley and Larcinese (2011), Gagliarducci et al. (2010, 2011), and Mocan and Altindag (2013). Second, we measure MPs' *parliamentary activity* based on the number of questions they asked and their participation in debates (similar to Arnold et al., 2014 and Mocan and Altindag, 2013). Third, we follow Keefer and Khemani (2009) and use the utilization rate of the Member of Parliament Local Area Development Scheme (MPLADS) which offers several important advantages as a measure of effort on behalf of an MP's respective constituency. We use two proxies for criminal MPs, *Criminal(a)* for all MPs with at least one crime, and *Criminal(b)* only for those with a least two charges.

Our empirical results support the conclusions from our model, but also provide further interesting details. Focusing on the first measure, we find that criminal MPs are related to higher absenteeism rates. This relationship is robust to the inclusion of party and state fixed effects, as well as controls for electoral competition, monitoring intensity and candidate characteristics. On the other hand, results concerning the second measure indicate that there is no obvious correlation between *parliamentary activity* and criminal background. Our model has suggested that differences in effort levels between criminals and other MPs might be partly explained by the potential to extract rents or differences in monitoring intensity. Wealthier constituencies are more attractive for rent extraction and related to better monitoring, which led to the hypotheses that criminal MPs in rich constituencies work relatively more because they put more emphasis on their reelection prospects. This is exactly what the data show: The difference in effort between criminals and other MPs is particularly pronounced in poor constituencies and decreases in richer areas. Criminal background has a statistically significant negative relation with both *attendance rates* and *parliamentary activity* in less and medium developed constituencies.

With regard to making use of the MPLADS to develop their constituency, criminal MPs are also related to lower utilization rates. This coefficient is not significant for *Criminal(a)* while being statistically significant for *Criminal(b)*. This suggests that not all MPs with criminal charges necessarily form a homogenous group: there are some individuals who have been criminal only once or were falsely accused and those that repeatedly broke the law. For the latter it is much more likely that they still engage in criminal activities and can, for example, use bribes or voter intimidation to secure their reelection.

There are potential concerns as to whether our coefficients have a causal interpretation. Omitted variable bias, in our case mostly in the form of selection effects, might bias our coefficients. Based on our theoretical considerations we argue that it is more likely that our point estimates are upwardly rather than downwardly biased. This assumption is supported by a series of robustness checks. For the MPLADS variable, we follow Keefer and Khemani (2009) and run a series of falsification tests to see whether omitted variables like political or social fragmentation are responsible for our results. As expected, including these additional covariates separately or jointly leads to more negative coefficients. Moreover, the relationship is robust to controlling for the utilization rate in the period before, which should capture omitted constituency-specific variables. Specifically for *MPLADS utlization* we use selection on observables to demonstrate that the negative and significant coefficient for *Criminal(b)* constitutes an upper bound for the negative effect of criminal background on effort.

Similarly, through a series of more general robustness checks we show that the results using a matching estimator are quantitatively very similar to the OLS estimates, with on average slightly more negative coefficients. Moreover, the matching statistics suggest a good covariate balance across the treatment and control groups. The baseline results are further supported by regressions omitting the most influential observations or potential outliers . Criminal MPs are, on average, associated with higher abseentism and lower utilization rates. *Criminal(a)* relates to on average about 5% lower *attendance rates,* and *Criminal(b)* relates to about 7% lower utilization rates of the MPLADS program. We argue and explain why we think regression discontinuity and instrumental variable designs are invalid or at least not feasible alternatives. Instead we use endogenous binary-variable models that explicitly model the selection process, with the existence of other criminal candidates as an additional exogenous selection-variable. Finally, we draw on the seminal paper of Altonji et al. (2005), and demonstrate that our findings are unlikely to be caused solely by selection bias. Selection-on-unobservables would have to work partly contrary to selection on observables, and its effect would have to be 2 to 21 times stronger to fully explain our results.

Credibility and trust in representatives is of crucial importance for the integrity of India's democracy. While transparency increases reporting of corruption events and corrupt officials (see Vadlamannati and Cooray, 2015) and the provisioning of criminal information to voters should help them make informed choices, a large number of criminal candidates still make it to the parliament. Step by step, evidence shows that there seem to be detrimental consequences to criminals holding public office, and we hope that our paper adds to the growing evidence that supports enhanced transparency.

A Appendix. A generalized model

In section 3, we assumed a specific functional relationship between political effort and the fraction of informed voters who end up voting for the incumbent. In this section, we relax this assumption.[38]

Again, consider two incumbents who differ only in the criminal characteristic. As before, the corresponding personal characteristic vectors are denoted by x^c and x^n. Let $\mathcal{C}$ be the characteristic space (i.e. the space consisting of all possible characteristic combinations). In general, a function which represents the fraction of informed voters who end up voting for the incumbent needs to assign a share of voters (i.e. a number from the unit interval) to each characteristic vector $x \in \mathcal{C}$ and each effort level $e \in [0,1]$. Consider such a function $f(e,x)$ where $f : [0,1] \times \mathcal{C} \to [0,1]$. We assume that $f(e,x)$ is differentiable with respect to e, where $f_e > 0$ and $f_{ee} < 0$ for all $x \in \mathcal{C}$ (i.e. the marginal impact of effort on the share of voters is positive, but decreasing). Furthermore, empirical evidence indicates that voters penalize criminality (see section 3). Therefore, a criminal background as a characteristic feature decreases the marginal impact of effort on the fraction that is informed, $f_e(e,x^n) > f_e(e,x^c)$ for all $e \in (0,1)$. It seems plausible that the higher the effort of a criminal MP, the less skeptical the voters will be.In other words, we assume that criminal MPs can partly overcome the skepticism of the voters towards them when engaging in considerable effort. Thus, the difference between the marginal impacts of effort $\Delta^m := f_e(e,x^n) - f_e(e,x^c)$ is assumed to decrease in effort, $\Delta^m_e < 0$.

Assuming an interior solution, the first-order condition of optimization problem (1) faced by an incumbent with characteristic $x \in \mathcal{C}$ is

$$\frac{\iota}{(1-\iota)} \cdot \frac{1}{2(b-a)} \cdot U \cdot f_e(e,x) = 1 \tag{3}$$

where ι, U, a and b are defined as in section 3.

Proposition 3 shows that in the generalized model, the qualitative impact of ι, U and b on incumbent's optimal effort level are the same as in section 3.

[38] We still use the following notation for partial derivatives: $\frac{\partial f}{\partial x} := f_x$ and $\frac{\partial^2 f}{\partial x \partial y} := f_{xy}$.

Proposition 3. The optimal effort level of the incumbent is higher if

(i) voters are better informed (high ι)

(ii) the MP's utility from holding office is higher (high U)

(iii) the expected level of support is lower (low b)

Proof. Note that the optimal effort level of an incumbent with characteristic $x \in \mathcal{C}$ is implicitly given by equation (3). Consider the left-hand side of (3), $l(e, U, \iota, x) := \frac{\iota}{(1-\iota)} \cdot \frac{1}{2(b-a)} \cdot U \cdot f_e(e, x)$, and observe that $l_U, l_\iota > 0$ and $l_b < 0$. Now, recall that $sign(l_y) = sign(e^*_y)$ where $y \in \{\iota, U, b\}$ $\square$

The next proposition examines the difference between the optimal effort levels of a a criminal and a non-criminal incumbent, e^*_c and e^*_n.

Proposition 4. The difference between optimal effort levels $\Delta_{e^*} = e^*_n - e^*_c$ is

(i) strictly positive

(ii) decreasing in ι

(iii) decreasing in U

Proof. (i) The optimal effort levels are implicitly given by (3). Equation (3) can be rewritten as $f_e(e, x) = z$ where $z \equiv \frac{(1-\iota)\cdot 2(b-a)}{\iota \cdot U}$. Thus, the optimal effort levels satisfy $f_e(e^*_n, x^n) = z = f_e(e^*_c, x^c)$. By assumption, it holds that $f_e(e, x^n) > f_e(e, x^c)$ for all effort levels. It follows that $e^*_n \neq e^*_c$. Since, furthermore, f_e is strictly monotone decreasing in e for all $x \in \mathcal{C}$, $f_e(e^*_n, x^n) = f_e(e^*_c, x^c)$ implies $e^*_c < e^*_n$. Hence, $\Delta_{e^*} > 0$. (ii) Proposition (3) shows that optimal effort levels are increasing in ι. At the same time, by assumption, the difference between marginal impacts of effort Δ^m decreases. Consequently, the difference Δ_{e^*} is decreasing in ι. Statement (iii) can similarly be shown to hold. $\square$

References

Abadie, A. and G. W. Imbens (2006): "Large sample properties of matching estimators for average treatment effects," *Econometrica*, 74, 235–267. 22

——— (2009): "Matching on the estimated propensity score," NBER Working Paper No. 15301. 22

——— (2011): "Bias-corrected matching estimators for average treatment effects," *Journal of Business and Economic Statistics*, 29, 1–11. 22

Aidt, T., M. A. Golden, and D. Tiwari (2015): "Incumbents and criminals in the Indian National Legislature," Mimeo. 1, 4, 5, 13, 14, 15, 26

Altonji, J. G., T. E. Elder, and C. R. Taber (2005): "Selection on observed and unobserved variables: Assessing the effectiveness of catholic schools," *Journal of Political Economy*, 113, 151–184. 3, 19, 24, 27

Angrist, J. D. and J.-S. Pischke (2008): *Mostly harmless econometrics: An empiricist's companion*, Princeton, New Jersey: Princeton University Press. 21

Arnold, F., B. Kauder, and N. Potrafke (2014): "Outside earnings, absence, and activity: Evidence from German parliamentarians," *European Journal of Political Economy*, 36, 147–157. 2, 10, 26

Banerjee, A. V., D. Green, J. Green, and R. Pande (2009): "Can voters be primed to choose better legislators? Experimental evidence from rural India," Mimeo. 4

Banerjee, A. V., D. Green, J. McManus, and R. Pande (2014): "Are poor voters indifferent to whether elected leaders are criminal or corrupt?" *Political Communication*, 31, 391–407. 6

Banerjee, A. V. and R. Somanathan (2007): "The political economy of public goods: Some evidence from India," *Journal of Development Economics*, 82, 287–314. 20

Baskaran, T., B. Min, and Y. Uppal (2015): "Election cycles and electricity provision: Evidence from a quasi-experiment with Indian special elections," *Journal of Public Economics*, 126, 64–73. 14

Bellows, J. and E. Miguel (2008): "War and local collective action in Sierra Leone," *Journal of Public Economics*, 93, 1144–1157. 24

Besley, T. (2004): "Joseph Schumpeter lecture: Paying politicians: Theory and evidence," *Journal of the European Economic Association*, 2, 193–215. 1

Besley, T. and R. Burgess (2002): "The political economy of government responsiveness: Theory and evidence from India," *Quarterly Journal of Economics*, 117, 1415–1451. 1, 3, 5, 7

Besley, T. and A. Case (1993): "Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits," NBER Working Paper No. 4575. 1

Besley, T. and S. Coate (1997): "An economic model of representative democracy," *The Quarterly Journal of Economics*, 85–114. 1

Besley, T. and V. Larcinese (2011): "Working or shirking? Expenses and attendance in the UK Parliament," *Public Choice*, 146, 291–317. 2, 9, 26

Brollo, F. (2010): "Who is punishing corrupt politicians: Voters or the central government? Evidence from the Brazilian anti-corruption program," IGIER Working Paper No. 336. 4

Cameron, A. C., J. B. Gelbach, and D. L. Miller (2011): "Robust inference with multiway clustering," *Journal of Business and Economic Statistics*, 29, 238–249. 16

Cameron, A. C. and P. K. . Trivedi (2005): *Microeconometrics: Methods and applications*, New York: Cambridge University Press. 23

Chaturvedi, M., T. Ghosh, and L. Bhandari (2011): "Assessing income distribution at the district level for India using nighttime satellite imagery," *Proceedings of the Asia-Pacific Advanced Network*, 32, 192–217. 14

Chemin, M. (2012): "The welfare effects of criminal politicians: A discontinuity-based approach," *Journal of Law and Economics*, 55, 667–690. 2, 4, 11, 23, 26

Dutta, B. and P. Gupta (2012): "How do Indian voters respond to candidates with criminal charges: Evidence from the 2009 Lok Sabha elections," MPRA Paper No. 38417. 1, 5, 6, 15, 22

Ferraz, C. and F. Finan (2011): "Electoral accountability and corruption: Evidence from the audits of local governments," *American Economic Review*, 101, 1274–1311. 4, 5

Fisman, R., F. Schulz, and V. Vig (2014): "The private returns to public office," *Journal of Political Economy*, 122, 806–862. 5, 9, 18

Gagliarducci, S., T. Nannicini, and P. Naticchioni (2010): "Moonlighting politicians," *Journal of Public Economics*, 94, 688–699. 2, 9, 26

——— (2011): "Electoral rules and politicians' behavior: A micro test," *American Economic Journal: Economic Policy*, 3, 144–174. 1, 9, 26

Hanusch, M. and P. Keefer (2013): "Promises, Promises: Vote-buying and the electoral strategies of the non-credible politicians," World Bank Policy Research Working Paper 6653. 4

Henderson, V., A. Storeygard, and D. N. Weil (2011): "A bright idea for measuring economic growth," *The American Economic Review*, 101, 194–199. 14

Kapur, D. and M. Vaishnav (2011): "Quid pro quo: Builders, politicians, and election finance in India," Center for Global Development Working Paper No. 276. 4, 18

Kauder, B. and N. Potrafke (2015): "Just hire your spouse! Evidence from a political scandal in Bavaria," *European Journal of Political Economy*. 8

Keefer, P. and S. Khemani (2004): "Why do the poor receive poor services?" *Economic and Political Weekly*, 935–943. 1

——— (2009): "When do legislators pass on pork? The role of political parties in determining legislator effort," *American Political Science Review*, 103, 99–112. 2, 8, 9, 10, 11, 13, 16, 19, 20, 21, 26, 27

Kumar, R. (2010): "Vital stats: Private members bills in Lok Sabha," PRS Legislative Research. 10

MacKinnon, J. G. and M. D. Webb (2015): "Wild bootstrap inference for wildly different cluster sizes," Queen's Economics Department Working Paper No. 1314. 16

Maddala, G. S. (1983): *Limited-dependent and qualitative variables in econometrics*, Cambridge: Cambridge University Press. 23

McCrary, J. (2008): "Manipulation of the running variable in the regression discontinuity design: A density test," *Journal of Econometrics*, 142, 698–714. 23

Mocan, N. and D. T. Altindag (2013): "Salaries and work effort: An analysis of the European Union parliamentarians," *The Economic Journal*, 123, 1130–1167. 2, 9, 10, 26

Nooruddin, I. and P. Chhibber (2008): "Unstable politics: Fiscal space and electoral volatility in the Indian states," *Comparative Political Studies*, 41, 1069–91. 21

Oster, E. F. (2013): "Unobservable selection and coefficient stability: theory and validation," *NBER Working Paper*. 25

Paul, S. and M. Vivekananda (2004): "Holding a mirror to the new Lok Sabha," *Economic and Political Weekly*, 39, 4927–4934. 4

Prakash, N., M. Rockmore, and Y. Uppal (2014): "Do criminal representatives hinder or improve constituency outcomes? Evidence from India," Working papers 2014-20, University of Connecticut, Department of Economics. 4, 11, 26

Snyder, J. M. and D. Strömberg (2010): "Press coverage and political accountability," *Journal of Political Economy*, 118, 355–408. 5

Strömberg, D. (2001): "Mass media and public policy," *European Economic Review*, 45, 652–663. 5

——— (2004): "Mass media competition, political competition, and public policy," *The Review of Economic Studies*, 71, 265–284. 5

Svaleryd, H. and J. Vlachos (2009): "Political rents in a non-corrupt democracy," *Journal of Public Economics*, 93, 355–372. 5

Tullock, G. (1980): "Efficient rent-seeking," in *Toward a theory of the rent-seeking society*, ed. by J. M. Buchanan, R. D. Tollison, and G. Tullock, College Station: Texas A&M University Press., 97–112. 6

Vadlamannati, K. C. and A. Cooray (2015): "Transparency pays? Evaluating the effects of the freedom of information laws on perceived government corruption," . 27

Vaishnav, M. (2011): "The market for criminality: Money, muscle and elections in India," Mimeo. 4, 12

——— (2012): "The merits of money and "muscle": Essays on criminality, elections and democracy in India," Mimeo. 7

Tables and Figures

Table 1: Descriptive statistics

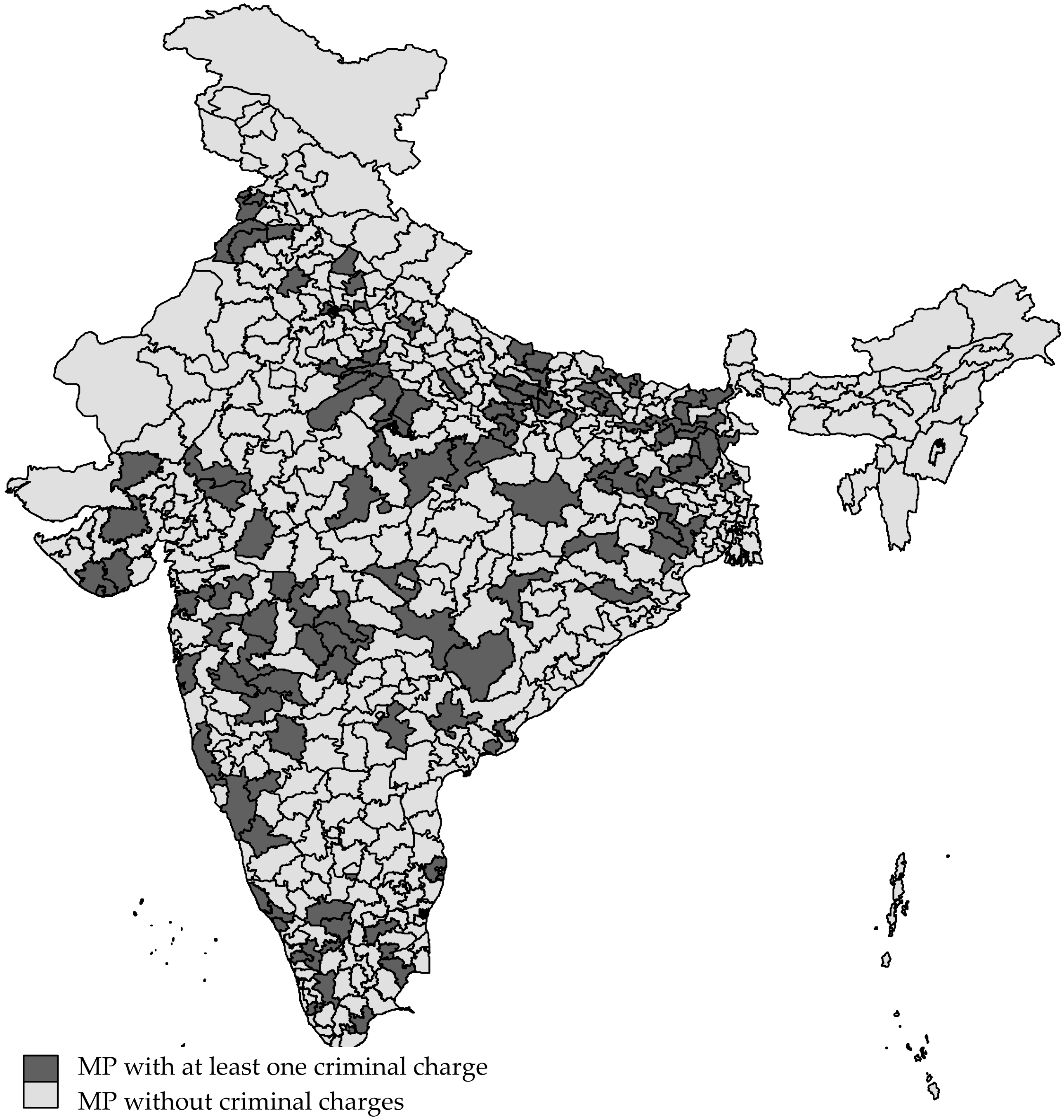
	Count	Mean	SD	Min	Max	Mean - Normal	Mean - Criminal
Effort measure							
Attendance rate	394	0.71	0.17	0.06	0.96	0.725	0.670
Parliamentary activity	394	0.82	0.80	0.00	4.38	0.810	0.847
MPLADS utilization	439	105.65	20	60.50	260.00	106.016	104.451
Criminal Record							
Criminal(a)	439	0.24	0.43	0	1		
Criminal(b)	439	0.07	0.25	0	1		
Electoral Competitiveness							
Party stronghold (3time winner)	439	0.21	0.41	0	1	0.224	0.154
Winning margin (2004)	439	0.12	0.10	0.00	0.61	0.127	0.110
PC is reserved for minority SC or ST	439	6.55	0.33	4.02	7.35	6.550	6.535
No of voters	439	0.24	0.43	0	1	0.239	0.231
Monitoring							
Economic development (log sum of night light intensity)	439	9.78	1.03	6.36	11.58	9.796	9.706
Literacy rate	439	55.69	12.05	25.86	85.43	56.051	54.545
Voter turnout (2004)	439	0.60	0.12	0.33	0.92	0.605	0.570
Candidate characteristics							
Candidate age (at election)	439	52.17	10.60	26	77	52.731	50.375
Education of MP	439	1.61	0.74	0	2	1.642	1.500
Experience in parliament	439	0.72	1.09	0	3	0.773	0.548
Gender	439	0.92	0.27	0	1	0.916	0.942
Log of net assets	439	16.13	1.18	1.61	20.33	16.147	16.093

Notes: Descriptive statistics were calculated for the maximum regression sample size. MPLADS utilization can be on average higher than 100% after 2004 as in the starting years not all funds were used up and consequently partly transferred in the next period.

Table 2: Criminals by party affiliation

	Normal		Criminal	
Bharatiya Janata Party	82	[78.8%]	22	[21.2%]
Communist Party of India (Marxist)	33	[82.5%]	7	[17.5%]
Indian National Congress	103	[84.4%]	19	[15.6%]
Rashtriya Janata Dal	11	[52.4%]	10	[47.6%]
Other	106	[69.7%]	46	[30.3%]
Total	335	[76.3%]	104	[23.7%]

Figure 1: Geographical distribution of candidates with criminal charges across constituencies for the 14th Lok Sabha (2004 national election).



Notes: The dark color indicates constituencies that in 2004 elected a politician with facing criminal charges in the published affidavit. State boundaries are not displayed to reduce complex. Nearly all states have some MPs with criminal background, a detailed list of the distribution by state is provided in Appendix Table 2.

Table 3: Main results for attendance rates and parliamentary activity

Dependent variable: Attendance rate	(1)		(2)		(3)		(4)	
Criminal(a)	**-0.046***	**[0.025]**	**-0.049****	**[0.021]**	**-0.050****	**[0.020]**	**-0.044***	**[0.023]**
Dependent variable: Parliamentary activity	(5)		(6)		(7)		(8)	
Criminal(a)	**0.002**	**[0.066]**	**-0.006**	**[0.065]**	**-0.003**	**[0.070]**	**-0.006**	**[0.075]**
Number of MPs	394		394		394		394	
State Dummies	Yes		Yes		Yes		Yes	
Party Dummies	No		Yes		Yes		Yes	
Electoral Competitiveness	No		Yes		Yes		Yes	
Monitoring Intensity	No		No		Yes		Yes	
Candidate Characteristics	No		No		No		Yes	
Dependent variable: Attendance rate	(9)		(10)		(11)		(12)	
Criminal(b)	**-0.126****	**[0.051]**	**-0.128*****	**[0.046]**	**-0.126*****	**[0.045]**	**-0.105****	**[0.045]**
Dependent variable: Parliamentary activity	(13)		(14)		(15)		(16)	
Criminal(b)	**-0.180**	**[0.160]**	**-0.181**	**[0.152]**	**-0.176**	**[0.155]**	**-0.151**	**[0.152]**
Number of MPs	394		394		394		394	
State Dummies	Yes		Yes		Yes		Yes	
Party Dummies	No		Yes		Yes		Yes	
Electoral Competitiveness	No		Yes		Yes		Yes	
Monitoring Intensity	No		No		Yes		Yes	
Candidate Characteristics	No		No		No		Yes	

Notes: Dependent variable as specified above over the full legislative period 2004-2009. Standard errors are clustered at the party level. *Criminal(a)* is defined as those having at least one criminal charge against them, *Criminal(b)* as those having more than one criminal charge against them. All regressions include the control variables as specified in Table 1 as indicated in the respective column. *** (**, *) indicates significance at the 1 (5, 10) percent level respectively.

Table 4: Interaction effects

Dependent variable: Attendance rate

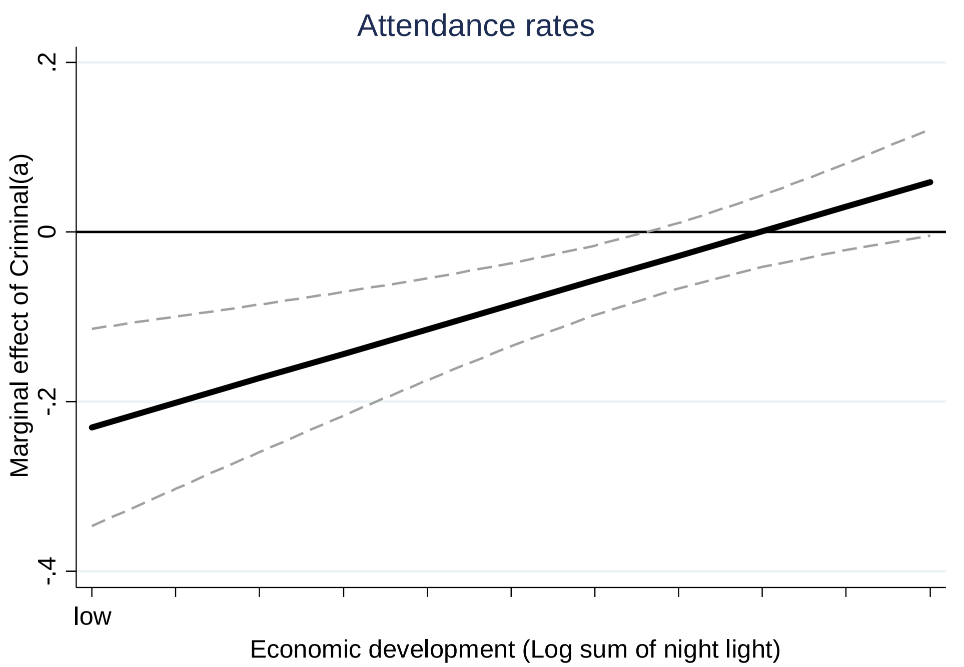
Criminal(a)	-0.056***	[0.019]	-0.053**	[0.023]	-0.611***	[0.160]	-0.113	[0.119]
Interaction with:								
Party Stronghold	0.070	[0.066]						
Margin (2004)			0.089	[0.203]				
Economic Development					0.058***	[0.016]		
Literacy rate							0.001	[0.002]
Number of MPs	394		394		394		394	

Dependent variable: Parliamentary activity

Criminal(a)	0.019	[0.084]	0.036	[0.106]	-1.900***	[0.559]	-0.068	[0.471]
Interaction with:								
Party Stronghold	-0.147	[0.112]						
Margin (2004)			-0.408	[0.718]				
Economic Development					0.195***	[0.059]		
Literacy rate							0.001	[0.008]
Number of MPs	392		392		392		392	

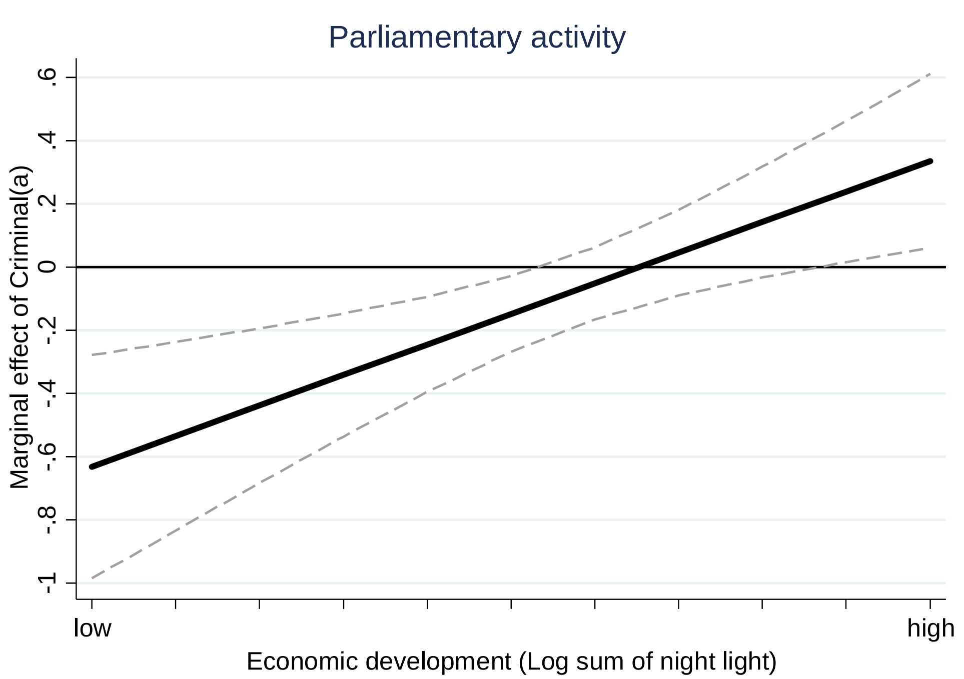
Notes: Dependent variable as specified above over the full legislative period 2004-2009. All regressions include all control variables as specified in table 1, including dummies for major states and parties. *Criminal(a)* is defined as those having at least one criminal charge against them. Standard errors [in brackets] are clustered at the party level. *** (**, *) indicates significance at the 1 (5, 10) percent level respectively.

Figure 2: Marginal Effect of *Criminal(a)* on *attendance rates* conditional on economic development



Notes: Marginal effect of s *Criminal(a)* MP Dummy for different levels of economic development. Dotted lines represent the 95% confidence intervals.

Figure 3: Marginal Effect of *Criminal(a)* on *parliamentary activity* conditional on economic development



Notes: Marginal effect of a *Criminal(a)* MP Dummy for different levels of economic development. Dotted lines represent the 95% confidence intervals.

Table 5.1: Main results for Member of Parliament Local Area Development Scheme (MPLADS) utilization

	(1)		(2)		(3)		(4)	
Criminal(a)	**-3.014**	**[3.519]**	**-3.302**	**[3.563]**	**-3.273**	**[3.601]**	**-3.419**	**[3.733]**
	(5)		(6)		(7)		(8)	
Criminal(b)	**-5.080****	**[2.677]**	**-7.436****	**[3.005]**	**-7.571****	**[3.106]**	**-7.723****	**[3.415]**
Number of MPs	439		439		439		439	
State dummies	Yes		Yes		Yes		Yes	
Party dummies	No		Yes		Yes		Yes	
Competition controls	No		Yes		Yes		Yes	
Monitoring controls	No		No		Yes		Yes	
Candidate characteristics	No		No		No		Yes	

Table 5.2: Robustness tests (based on column 4)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Criminal(b)	**Coef.**	**-7.793***	**-7.658****	**-7.479****	**-9.664****	**-7.679****	**-7.643****	**-5.642***	**-8.541****
Additional controls for	**SE**	**[4.050]**	**[3.554]**	**[3.355]**	**[3.482]**	**[3.529]**	**[3.506]**	**[3.015]**	**[3.676]**
Development fund utilization (1999-2004)		Yes					Yes		
Leftover funds from predecessor			Yes				Yes		
Political fragmentation 1991- 1999				Yes			Yes		
Caste and religious fragmentation					Yes		Yes		
Electoral volatility						Yes	Yes		
Sensitivity analysis									
Omit 10 constituencies with highest utilization rates								Yes	
Only Criminal(b) vs. Non-Criminals									Yes

Notes: Robustness checks. Dependent variable is the cumulative utilization rate over the 2006-2009 period. *Criminal(a)* is defined as those having at least one criminal charge against them, *Criminal(b)* as those having more than one criminal charge against them. All regressions include the control variables as specified in Table 1 as indicated in the respective column. Standard errors [in brackets] are clustered at the state level. *** (**, *) indicates significance at the 1 (5, 10) percent level respectively.

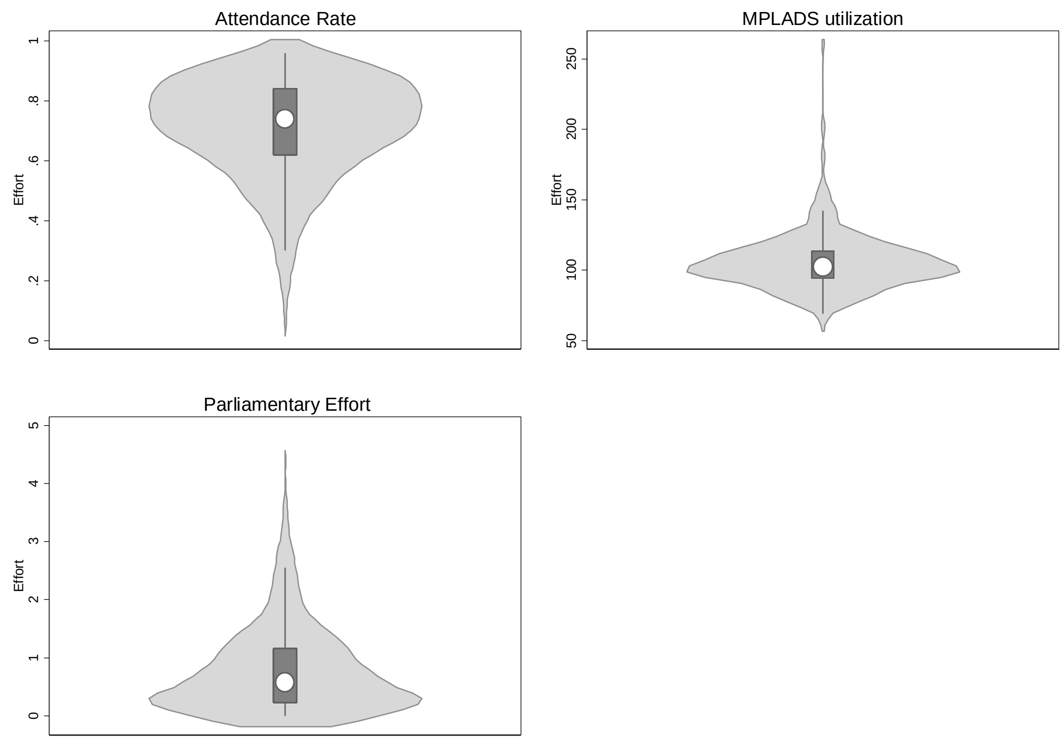
Table 6: Robustness checks for all dependent variables

Dependent variable	Attendance rate		Parliamentary activity		MPLADS utilization	
Baseline results	Coef.	SE	Coef.	SE	Coef.	SE
Criminal(a)	-0.043*	[0.023]	-0.006	[0.075]	-3.419	[3.733]
Criminal(b)	-0.104**	[0.045]	-0.150	[0.153]	-7.723**	[3.415]
	Matching estimator (nearest neighbor matching)					
Criminal(a) & NN (2)	-0.059**	[0.023]	-0.023	[0.136]	-7.548**	[3.294]
Criminal(a) & NN (3)	-0.053**	[0.022]	0.016	[0.127]	-5.136*	[2.787]
Criminal(b) & NN (2)	-0.125***	[0.045]	-0.342*	[0.203]	-19.639***	[6.650]
Criminal(b) & NN (3)	-0.121***	[0.044]	-0.461**	[0.216]	-14.471***	[4.936]
	Treatment effect estimator					
Criminal(a)	-0.184***	[0.070]	-0.048	[0.109]	-12.047***	[3.617]
Lamda	0.09		0.12		4.28	
Rho	0.57		0.16		0.22	
Prob > Chi^2	0.074		0.118		0.004	
Regressions	*w/o 2% largest values of dependent variables*					
Criminal(a)	-0.046*	[0.024]	0.005	[0.072]	-2.155	[2.792]
Criminal(b)	-0.101**	[0.045]	-0.034	[0.086]	-5.699*	[2.907]
	w/o 1% largest positive and negative residuals					
Criminal(a)	-0.042*	[0.022]	-0.034	[0.086]	-3.472	[2.811]
Criminal(b)	-0.113**	[0.042]	-0.137	[0.136]	-6.666**	[3.138]
	Using selection-on-observables to assess the bias from unobservables					
Controls (Restricted/ Full))	Selection ratio SR=ß$_R$/(ß$_U$-ß$_R$)					
Criminal(a)	Identified ß-set	SR	Identified ß-set	SR	Identified ß-set	SR
None (U_1) / Full controls (R)	[-0.030, -0.050]	3.3	[-0.060,-0.010]	1.5	[-3.419, -5.570]	11.4
Fixed effects (U_2) / Full controls (R)	[-0.030, -0.043]	3.7	[-0.070, 0.000]	6.4	[-3.419, -5.470]	17.2
Criminal(b						
None (U_1) / Full controls (R)	[-0.090, -0.104]	2.1	[-0.150, -10.690]	1.6	[-7.723, -10.690]	20.1
Fixed effects (U_2) / Full controls (R)	[-0.100, -0.104]	2.5	[-0.150,-10.550]	7.8	[-7.723, -10.550]	44.6

Notes: Matching was conducted on all variables that acted as controls in the prior regressions, including party and state dummies. The appendix shows balance statistics. The treatment effect regressions are estimated using maximum likelihood. In the first row, selection is based on all constituency characteristics from the baseline model. For the regression in the bottom part, we first calculated the baseline regression. Then we calculated the observations with the largest residuals and omitted them from the regressions. The selection ratio SR is further explained and derived in Altonji et al. (2005). The ratio indicates how much larger selection-on-unobservables would have to be to move the (negative) coefficient to zero. The identified set is explained in Oster (2014). It contains the range of possible ß-estimates under the assumption of proportional selection on un- and observables, and a maximum R-squared comparable to the standards fulfilled by randomized studies. If the set does not include 0, we cannot rule out selection-bias, but its effect is under the assumptions not sufficient to be problematic for a causal interpretation.

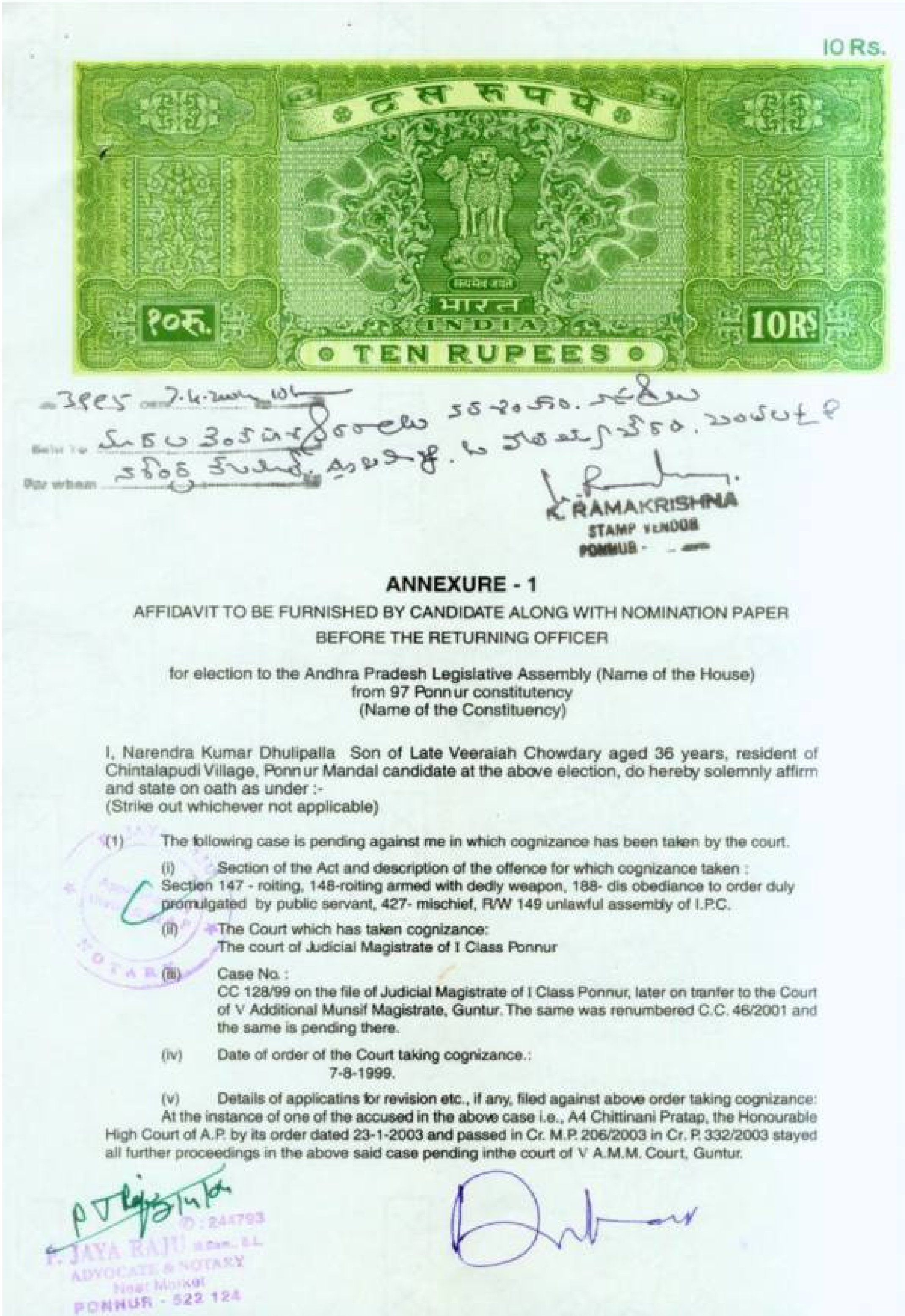
Appendix B (Online appendix)

Appendix Figure 1: Violinplots of dependent variables



Notes: Violin plots are a modification of box plots that add plots of the estimated kernel density to the summary statistics displayed by box plots. The white dot indicates the median value, the box comprises the 25th to 75th percentiles. Points beyond the upper and lower adjacent values indicate potential outliers. (Define x% as the value at the x-percentile of the distribution of the indicator. Vioplots then defines outliers as values being larger than 75% + 1.5 * |75%-25%| or smaller than 25% - 1.5 * |75%-25%|.)

Appendix Figure 2: Example of the affidavits that were used for coding the criminal variable



10 Rs.

दस रुपये

१०रु. भारत INDIA 10RS

TEN RUPEES

K. RAMAKRISHNA
STAMP VENDOR
PONNUR

ANNEXURE - 1

AFFIDAVIT TO BE FURNISHED BY CANDIDATE ALONG WITH NOMINATION PAPER
BEFORE THE RETURNING OFFICER

for election to the Andhra Pradesh Legislative Assembly (Name of the House)
from 97 Ponnur constitutency
(Name of the Constituency)

I, Narendra Kumar Dhulipalla Son of Late Veeraiah Chowdary aged 36 years, resident of Chintalapudi Village, Ponnur Mandal candidate at the above election, do hereby solemnly affirm and state on oath as under :-
(Strike out whichever not applicable)

(1) The following case is pending against me in which cognizance has been taken by the court.

(i) Section of the Act and description of the offence for which cognizance taken :
Section 147 - roiting, 148-roiting armed with dedly weapon, 188- dis obediance to order duly promulgated by public servant, 427- mischief, R/W 149 unlawful assembly of I.P.C.

(ii) The Court which has taken cognizance:
The court of Judicial Magistrate of I Class Ponnur

(iii) Case No. :
CC 128/99 on the file of Judicial Magistrate of I Class Ponnur, later on tranfer to the Court of V Additional Munsif Magistrate, Guntur. The same was renumbered C.C. 46/2001 and the same is pending there.

(iv) Date of order of the Court taking cognizance.:
7-8-1999.

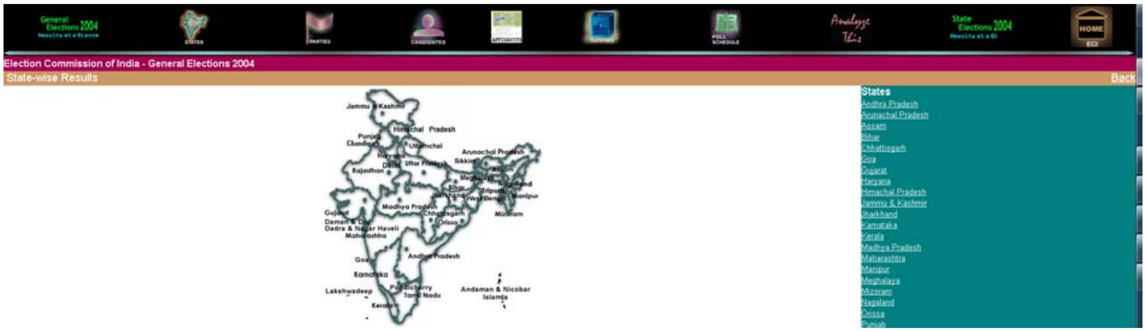
(v) Details of applicatins for revision etc., if any, filed against above order taking cognizance:
At the instance of one of the accused in the above case i.e., A4 Chittinani Pratap, the Honourable High Court of A.P. by its order dated 23-1-2003 and passed in Cr. M.P. 206/2003 in Cr. P. 332/2003 stayed all further proceedings in the above said case pending inthe court of V A.M.M. Court, Guntur.

P. JAYA RAJU B.Com., B.L.
ADVOCATE & NOTARY
Near Market
PONNUR - 522 124

Notes: Main source was http://eci.nic.in/archive/GE2004/States/index_fs.htm, an alternative source which does not contain all constituencies is http://myneta.info/loksabha2004/.

Replication:

1. Select the "Affidavits" option on the page of the election commission.

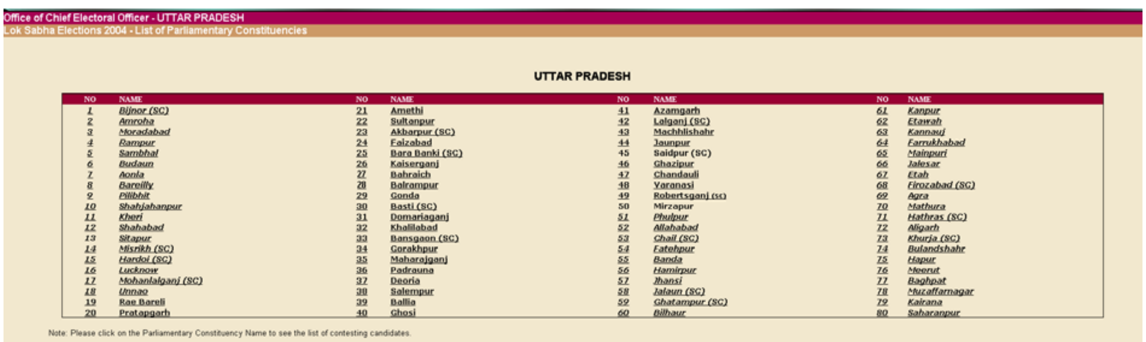


2. Select the state for the 2004 Lok Sabha election.

Election Commission of India
Affidavits of Candidates
Lok Sabha Elections 2004

Andaman & Nicobar Islands	Andhra Pradesh	Assam
Arunachal Pradesh	Bihar	Chandigarh
Chhattisgarh	Dadra & Nagar haveli	Daman & Diu
Goa	Gujarat	Haryana
Himachal Pradesh	Jammu & Kashmir	Jharkhand
Karnataka	Kerala	Lakshwadeep
Madhya Pradesh	Maharashtra	Manipur
Meghalaya	Mizoram	Nagaland
NCT of Delhi	Orissa	Pondicherry
Punjab	Rajasthan	Sikkim
Tamil Nadu	Tripura	Uttaranchal
Uttar Pradesh	West Bengal	

3. Select the constituency from the list within the state.



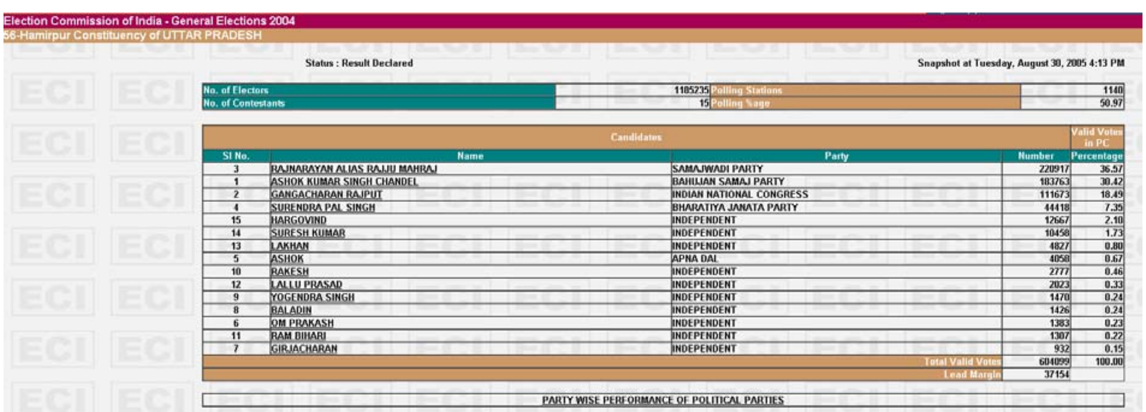
Office of Chief Electoral Officer - UTTAR PRADESH
Lok Sabha Elections 2004 - List of Parliamentary Constituencies

UTTAR PRADESH

NO	NAME	NO	NAME	NO	NAME	NO	NAME
1	Bijnor (SC)	21	Amethi	41	Azamgarh	61	Kanpur
2	Amroha	22	Sultanpur	42	Lalganj (SC)	62	Etawah
3	Moradabad	23	Akbarpur (SC)	43	Machhlishahr	63	Kannauj
4	Rampur	24	Faizabad	44	Jaunpur	64	Farrukhabad
5	Sambhal	25	Bara Banki (SC)	45	Saidpur (SC)	65	Mainpuri
6	Budaun	26	Kaiserganj	46	Ghazipur	66	Jalesar
7	Aonla	27	Bahraich	47	Chandauli	67	Etah
8	Bareilly	28	Balrampur	48	Varanasi	68	Firozabad (SC)
9	Pilibhit	29	Gonda	49	Robertsganj (SC)	69	Agra
10	Shahjahanpur	30	Basti (SC)	50	Mirzapur	70	Mathura
11	Kheri	31	Domariaganj	51	Phulpur	71	Hathras (SC)
12	Shahabad	32	Khalilabad	52	Allahabad	72	Aligarh
13	Sitapur	33	Bansgaon (SC)	53	Chail (SC)	73	Khurja (SC)
14	Misrikh (SC)	34	Gorakhpur	54	Fatehpur	74	Bulandshahr
15	Hardoi (SC)	35	Maharajganj	55	Banda	75	Hapur
16	Lucknow	36	Padrauna	56	Hamirpur	76	Meerut
17	Mohanlalganj (SC)	37	Deoria	57	Jhansi	77	Baghpat
18	Unnao	38	Salempur	58	Jalaun (SC)	78	Muzaffarnagar
19	Rae Bareli	39	Ballia	59	Ghatampur (SC)	79	Kairana
20	Pratapgarh	40	Ghosi	60	Bilhaur	80	Saharanpur

Note: Please click on the Parliamentary Constituency Name to see the list of contesting candidates.

4. Copy the relevant from the election results into an excel sheet for the respective constituency and select the winner.



Election Commission of India - General Elections 2004
56-Hamirpur Constituency of UTTAR PRADESH

Status : Result Declared

Snapshot at Tuesday, August 30, 2005 4:13 PM

No. of Electors	1185235	Polling Stations	1140
No. of Contestants	15	Polling %age	50.97

Candidates			Valid Votes in PC	
Sl No.	Name	Party	Number	Percentage
3	RAJNARAYAN ALIAS RAJJU MAHRAJ	SAMAJWADI PARTY	220917	36.57
1	ASHOK KUMAR SINGH CHANDEL	BAHUJAN SAMAJ PARTY	183763	30.42
2	GANGACHARAN RAJPUT	INDIAN NATIONAL CONGRESS	111673	18.49
4	SURENDRA PAL SINGH	BHARATIYA JANATA PARTY	44418	7.35
15	HARGOVIND	INDEPENDENT	12667	2.10
14	SURESH KUMAR	INDEPENDENT	10458	1.73
13	LAKHAN	INDEPENDENT	4827	0.80
5	ASHOK	APNA DAL	4058	0.67
10	RAKESH	INDEPENDENT	2777	0.46
12	LALLU PRASAD	INDEPENDENT	2023	0.33
9	YOGENDRA SINGH	INDEPENDENT	1470	0.24
8	BALADIN	INDEPENDENT	1426	0.24
6	OM PRAKASH	INDEPENDENT	1383	0.23
11	RAM BIHARI	INDEPENDENT	1307	0.22
7	GIRJACHARAN	INDEPENDENT	932	0.15
		Total Valid Votes	604099	100.00
		Lead Margin	37154	

PARTY WISE PERFORMANCE OF POLITICAL PARTIES

5. Select the winner from the affidavit list.

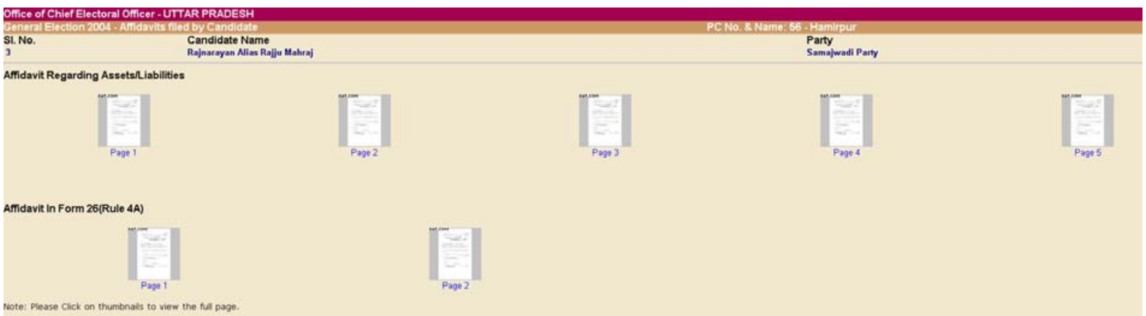

Office of Chief Electoral Officer - UTTAR PRADESH
Lok Sabha Elections 2004 - List of Parliamentary Constituencies

56 - Hamirpur

S.No	Name	Sex	Party Affiliation
1	Ashok Kumar Singh Chandel	M	Bahujan Samaj Party
2	Gangacharan Rajput	M	Indian National Congress
3	Rajnarayan Alias Rajju Mahraj	M	Samajwadi Party
4	Surendra Pal Singh	M	Bharatiya Janata Party
5	Ashok	M	Apna Dal
6	Om Prakash	M	Independent
7	Girjacharan	M	Independent
8	Baladin	M	Independent
9	Yogendra Singh	M	Independent
10	Rakesh	M	Independent
11	Ram Bihari	M	Independent
12	Lallu Prasad	M	Independent
13	Lakhan	M	Independent
14	Suresh Kumar	M	Independent
15	Hargovind	M	Independent

Note: Please click on the Candidate's Name to see the affidavits filed by him/her.

6. Download and code the PDF scans for the affidavit.


Office of Chief Electoral Officer - UTTAR PRADESH
General Election 2004 - Affidavits filed by Candidate PC No. & Name: 56 - Hamirpur

Sl. No.	Candidate Name	Party
3	Rajnarayan Alias Rajju Mahraj	Samajwadi Party

Affidavit Regarding Assets/Liabilities

Page 1 Page 2 Page 3 Page 4 Page 5

Affidavit In Form 26(Rule 4A)

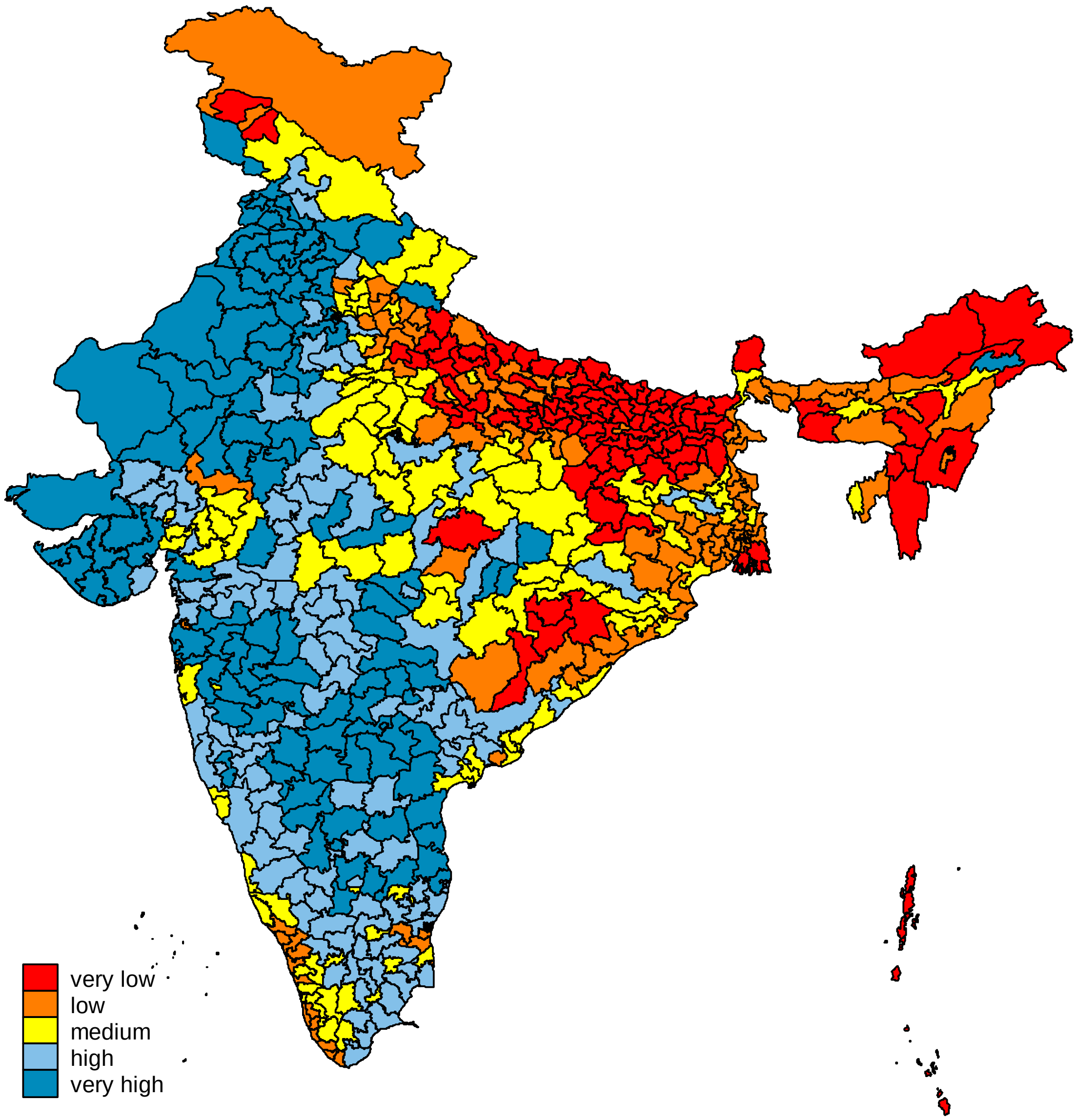
Page 1 Page 2

Note: Please Click on thumbnails to view the full page.

7. Continue and repeat for each constituency.

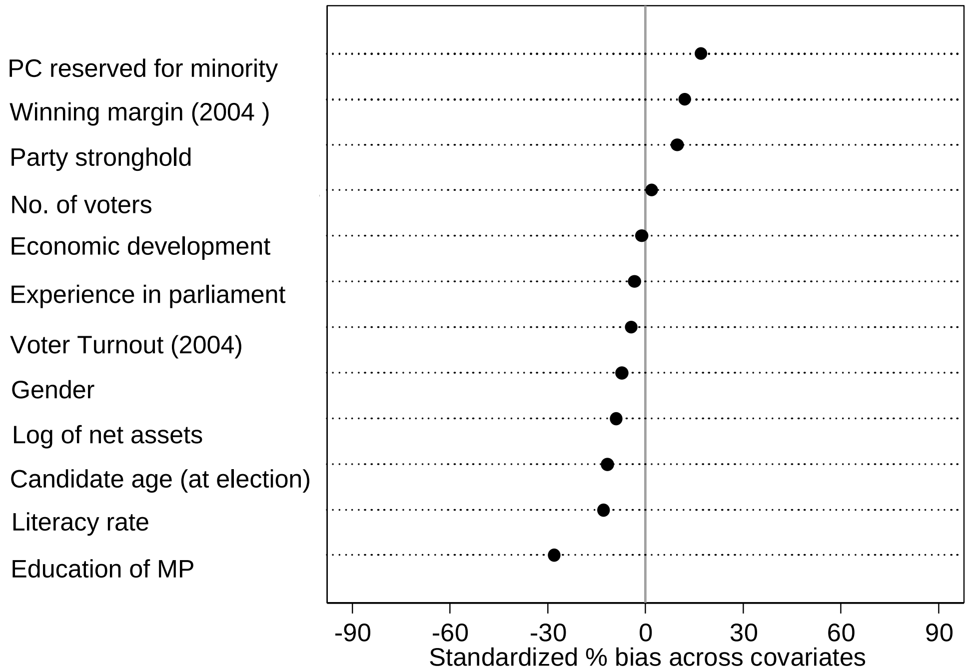
Each constituency was coded twice independently and the results were compared to detect any potential coding errors. In very few cases (<5), the affidavits were either not available or only in a local language that we could not translate. A list of these cases is available from the authors on request. In other cases, the names differed between either affidavits and election results, election summary results and statistics from other sources, or the homepage of the parliament and the election commission. We verified each of these cases with multiple sources to find the correct match.

Appendix Figure 3: Constituency-level approximation of economic development based on nighttime light intensity using satellite data.



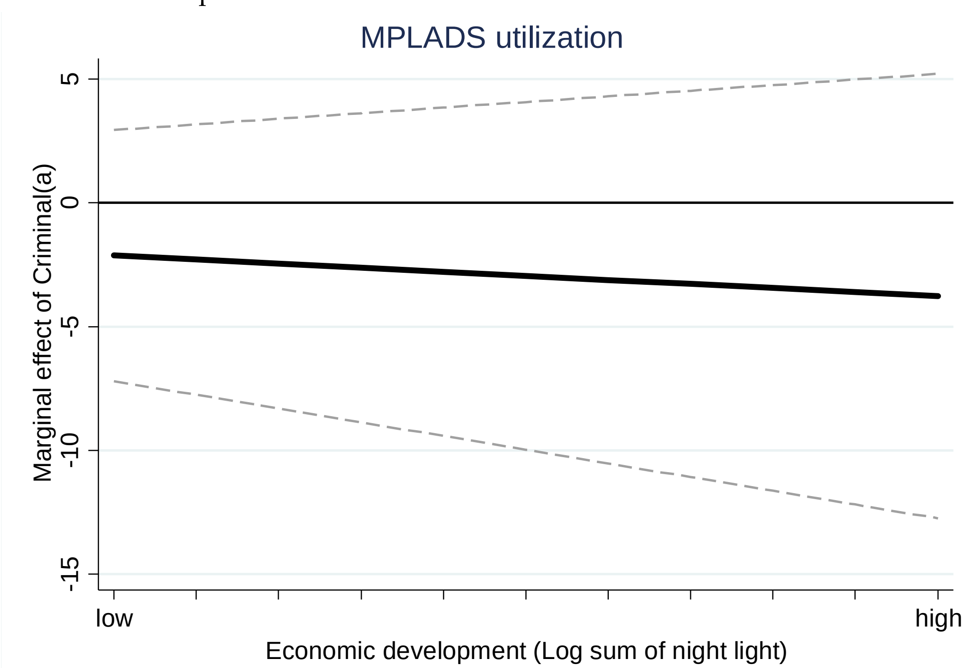
Notes: Created using average visible, stable light and cloud free from the F16 satellite for 2004. The original description states that "The cleaned up (file) contains the lights from cities, towns, and other sites with persistent lighting, including gas flares. Ephemeral events, such as fires have been discarded. Then the background noise was identified and replaced with values of zero. Data values range from 1-63. Areas with zero cloud-free observations are represented by the value 255." More information can be found at http://ngdc.noaa.gov/eog/gcv4_readme.txt. We use the tif-image-file from the National Geophysical Data Center and merged it in ArcGIS with constituency boundaries that were shared by Aidt et al. (2015). We then calculated the sum of lights using zonal statistics within the constituencies to proxy for economic development.

Appendix Figure 4: Covariate matching balance



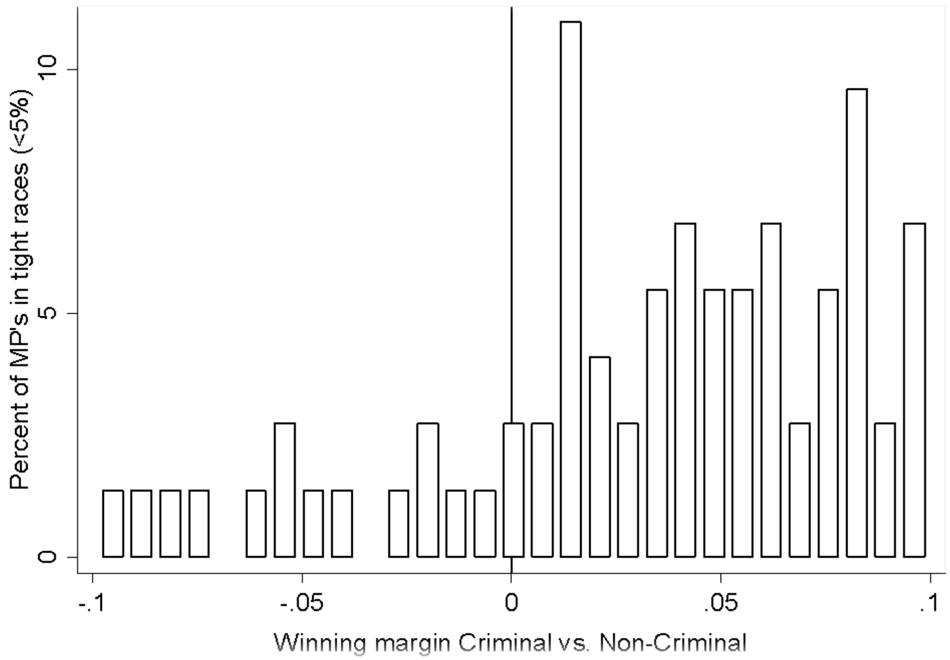
Notes: Relates to Table 6. Graphical depiction of matching balance. Results remain qualitatively unchanged when matching exactly on education.

Appendix Figure 5: Marginal Effect of Criminal(a) on parliamentary activity conditional on economic development



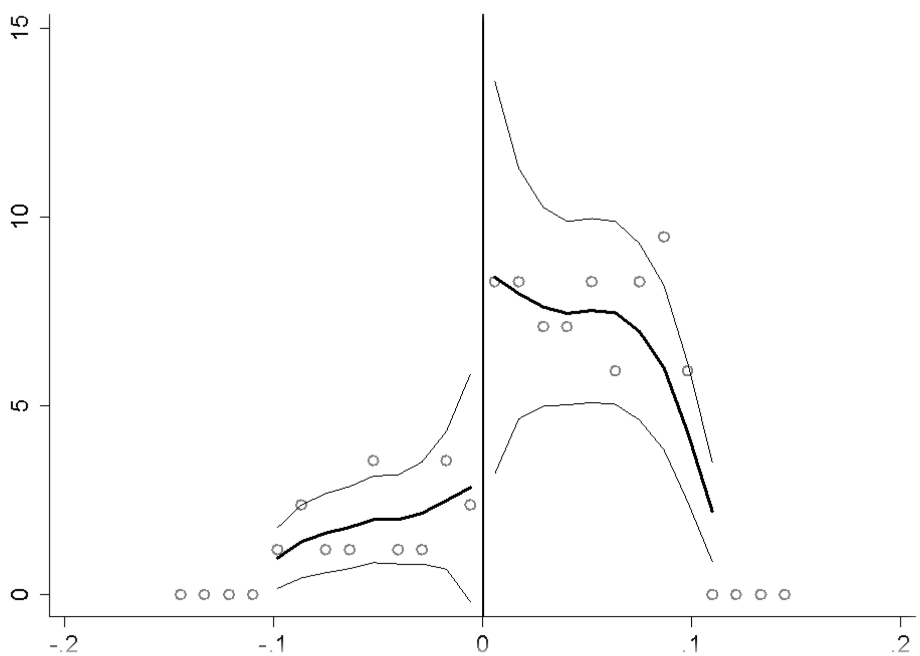
Notes: Marginal effect of a *Criminal(a)* MP Dummy on MPLADS utilization for different levels of economic development. Dotted lines represent the 95% confidence intervals.

Appendix Figure 6: Validity of Regression discontinuity assumptions – Density around the threshold



Notes: This suggests that criminals are able to manipulate elections. This seems to hold for the close elections with a winning margin +/- 10%.

Appendix Figure 7: McCrary test



Notes: Density graph based on the DCdensity program code from http://eml.berkeley.edu/~jmccrary/DCdensity/. The x-axis display the margin between a criminal winner and a non-criminal runner-up in close elections with a winning margin +/-10%.

Appendix Table 1: Frequency of Crimes

<table>
<tr><th>Number of Crimes</th><th>Frequency</th><th>Percentage</th><th>Specification 1</th><th>Specification 2</th><th>Specification 3</th></tr>
<tr><td>0</td><td>336</td><td>[76.54%]</td><td>Non-Criminals</td><td rowspan="2">Non-Criminals</td><td>Non-Criminals</td></tr>
<tr><td>1</td><td>54</td><td>[12.30%]</td><td rowspan="9">Criminal(a)</td><td>Excluded</td></tr>
<tr><td>2</td><td>20</td><td>[4.56%]</td><td rowspan="8">Criminal(b)</td><td rowspan="8">Criminal(b)</td></tr>
<tr><td>3</td><td>8</td><td>[1.82%]</td></tr>
<tr><td>4</td><td>7</td><td>[1.59%]</td></tr>
<tr><td>5</td><td>3</td><td>[0.68%]</td></tr>
<tr><td>8</td><td>1</td><td>[0.23%]</td></tr>
<tr><td>9</td><td>1</td><td>[0.23%]</td></tr>
<tr><td>13</td><td>3</td><td>[0.68%]</td></tr>
<tr><td>18</td><td>1</td><td>[0.23%]</td></tr>
</table>

Notes: Specification 1 is the main specification, used for example in Table 3, column 1-3. Specification 2 is used in all specifications using *Criminal(b)*, for example Table 3, column 4-6. The one exception is the last row in Table 5.2, where Specification 3 is used as a robustness check.

Appendix Table 2: Criminals by state

State\ Status	Normal		Criminal(a)			Normal		Criminal(a)	
Andaman Nicobar	1	[100.0%]	0	[0.0%]	Maharashtra	21	[53.8%]	18	[46.2%]
Andhra Pradesh	29	[90.6%]	3	[9.4%]	Manipur	2	[100.0%]	0	[0.0%]
Arunachal Pradesh	2	[100.0%]	0	[0.0%]	Meghalaya	1	[100.0%]	0	[0.0%]
Assam	14	[100.0%]	0	[0.0%]	Mizoram	1	[100.0%]	0	[0.0%]
Bihar	19	[61.3%]	12	[38.7%]	NCT of Delhi	3	[60.0%]	2	[40.0%]
Chhattisgarh	6	[75.0%]	2	[25.0%]	Nagaland	1	[100.0%]	0	[0.0%]
Dadra & Nagar Haveli	1	[100.0%]	0	[0.0%]	Orrisa	16	[84.2%]	3	[15.8%]
Daman & Diu	0	[0.0%]	1	[100.0%]	Pondicherry	1	[100.0%]	0	[0.0%]
Goa	1	[100.0%]	0	[0.0%]	Punjab	7	[63.6%]	4	[36.4%]
Gujarat	17	[73.9%]	6	[26.1%]	Rajasthan	20	[87.0%]	3	[13.0%]
Haryana	7	[87.5%]	1	[12.5%]	Sikkim	1	[100.0%]	0	[0.0%]
Himachal Pradesh	3	[100.0%]	0	[0.0%]	Tamil Nadu	28	[75.7%]	9	[24.3%]
Jammu & Kashmir	4	[100.0%]	0	[0.0%]	Tripura	2	[100.0%]	0	[0.0%]
Jharkhand	4	[44.4%]	5	[55.6%]	Uttar Pradesh	46	[74.2%]	16	[25.8%]
Karnataka	15	[75.0%]	5	[25.0%]	Uttaranchal	3	[100.0%]	0	[0.0%]
Kerela	12	[63.2%]	7	[36.8%]	West Bengal	34	[94.4%]	2	[5.6%]
Madhya Pradesh	13	[72.2%]	5	[27.8%]	Total	335	[76.3%]	104	[23.7%]

Appendix Table 3: Relation between dropping out of sample, dependent variable and variable of interest

Dependent variable	Criminal Winner(a)		MPLADS	
MP change from MP data	1.983	[2.518]	1.993	[2.516]
Bharatiya Janata Party	-0.087	[0.064]	1.038	[3.309]
Communist Party of India (Marxist)	-0.031	[0.099]	8.452*	[5.108]
Indian National Congress	-0.077	[0.056]	-2.829	[2.912]
Rashtriya Janata Dal	0.139	[0.127]	-2.954	[6.584]
Samajwadi Party	0.006	[0.095]	-3.291	[4.907]
Party stronghold (3time winner)	-0.026	[0.060]	4.214	[3.125]
Winning margin (2004)	0.002	[0.202]	-11.984	[10.446]
PC is reserved for minority SC or ST	-0.027	[0.074]	2.615	[3.810]
No of voters	-0.041	[0.046]	-1.600	[2.389]
Economic development	0.000	[0.032]	-1.318	[1.633]
Literacy rate	-0.004	[0.002]	0.289**	[0.126]
Voter turnout (2004)	-0.195	[0.253]	-20.825	[13.083]
Candidate Age (at election)	-0.003*	[0.002]	0.036	[0.089]
Education of MP	-0.042*	[0.025]	1.185	[1.277]
Experience in parliament	-0.010	[0.021]	-2.166*	[1.112]
Gender	0.090	[0.069]	-1.696	[3.576]
Log of net assets	0.008	[0.018]	0.240	[0.910]
Number of constituencies	540		540	
SE's clustered at	State level		State level	

Notes: Analyzes whether there is a relation between *Criminal(a)* and MP's dropping out of parliament, and between the dependent variable MPLADS utilization and MP's dropping out of parliament. Standard errors are clustered at the state level. If *Criminal(a)* would be significantly related to the change, this could bias our results. If it would be significantly related to our dependent variables, it would be an omitted variable bias problem. We are only able to capture the value of the dependent variable for those constituencies with a change during the term. *Attendance rates* and *Parliamentary activity* are not provided for those constituencies with a change in MP. We can see in both regressions that there is no significant relationship; hence this does not affect our results.

Appendix Table 4: Baseline results

	Attendance rate		Parliamentary activity		MPLADS utilization	
	(1)		(2)		(3)	
Bharatiya Janata Party	-0.003	[0.012]	-0.098	[0.116]	-1.824	[1.994]
Communist Party of India	0.064	[0.039]	-0.371**	[0.156]	5.376	[4.198]
Indian National Congress	0.055***	[0.014]	-0.125	[0.104]	-4.098*	[2.131]
Rashtriya Janata Dal	0.028	[0.017]	0.291**	[0.120]	-4.626	[3.665]
Samajwadi Party	0.075***	[0.027]	0.162*	[0.087]	-4.360	[2.752]
Party stronghold (3time winner)	0.032	[0.031]	0.027	[0.153]	0.426	[2.977]
Winning margin (2004)	-0.178*	[0.092]	-0.545	[0.331]	-4.529	[6.570]
PC is reserved for minority SC or ST	-0.022	[0.022]	-0.044	[0.109]	6.975	[6.946]
No of voters	0.057***	[0.014]	-0.106	[0.103]	-1.757	[2.219]
Economic development	-0.008	[0.013]	0.108*	[0.060]	-0.658	[1.051]
Literacy rate	0.002***	[0.001]	0.003	[0.003]	0.143	[0.110]
Voter turnout (2004)	-0.214***	[0.066]	-0.345	[0.651]	-21.143	[13.250]
Candidate age (at election)	0.003***	[0.001]	0.000	[0.003]	0.000	[0.108]
Education of MP	0.024***	[0.007]	0.048	[0.069]	0.112	[1.517]
Experience in parliament	-0.013	[0.011]	0.017	[0.040]	-1.092	[1.248]
Gender	-0.015	[0.032]	0.206*	[0.105]	-0.197	[4.002]
Net assets (log)	-0.019**	[0.008]	-0.002	[0.031]	-0.205	[0.448]
R-Squared	0.30		0.11		0.08	
Number of MPs	394		394		439	
State Dummies	Yes		Yes		Yes	

Notes: Dependent variable as specified above over the full legislative period 2004-2009, MPLADS 2005-2008. Standard errors are clustered at the party level. *** (**, *) indicates significance at the 1 (5, 10) percent level respectively.

Descriptive statistics for the matching specifications:

Appendix Table 5: Matching balance - descriptive statistics for treated and control group

	Mean			t-test	
Variable	Treated	Control	%bias	t	p>t
Party stronghold (3time winner)	0.23	0.16	16.60	1.28	0.202
Winning margin (2004)	0.57	0.57	-1.80	-0.14	0.887
PC is reserved for minority SC or ST	6.53	6.53	1.00	0.08	0.937
No of voters	0.15	0.11	10.70	0.88	0.379
Economic development	0.11	0.10	11.70	0.97	0.331
Literacy rate	9.71	9.75	-4.20	-0.30	0.766
Voter turnout (2004)	54.55	56.49	-15.50	-1.04	0.300
Candidate Age (at election)	50.38	51.45	-10.50	-0.81	0.420
Education of MP	1.50	1.76	-34.20	-2.69	0.008
No of times the MP has won before, experience in parliament	0.55	0.59	-4.30	-0.34	0.733
Gender	0.94	0.98	-13.70	-1.30	0.197
Log of Net Assets	16.09	16.14	-4.00	-0.39	0.700

Notes: Relates to Table 6. T-test is a simple t-test of differences in the mean. Outcome variable is attendance rate.

Appendix Table 6: Selection equations for treatment effect regressions

Dependent variable in second stage	Attendance rate		Parliamentary activity		MPLADS	
Dependent variable in selection equation	Criminal(a)		Criminal(a)		Criminal(a)	
Bharatiya Janata Party	-0.585***	[0.226]	-0.570**	[0.234]	-0.536	[0.336]
Communist Party of India	0.087	[0.386]	0.038	[0.405]	0.099	[0.445]
Indian National Congress	-0.343**	[0.156]	-0.379**	[0.167]	-0.471	[0.311]
Rashtriya Janata Dal	0.374	[0.430]	0.37	[0.418]	0.579***	[0.214]
Samajwadi Party	0.154	[0.187]	-0.015	[0.141]	0.018	[0.153]
Party stronghold (3time winner)	0.016	[0.302]	0.017	[0.269]	-0.074	[0.249]
Winning margin (2004)	-0.089	[0.908]	0.103	[0.792]	0.396	[0.721]
PC is reserved for minority SC or ST	-0.230*	[0.140]	-0.204	[0.153]	-0.233	[0.334]
No of voters	0.056	[0.221]	0.075	[0.238]	0.014	[0.165]
Economic development	-0.023	[0.125]	0.025	[0.107]	0.041	[0.116]
Literacy rate	-0.018*	[0.010]	-0.018*	[0.009]	-0.023	[0.014]
Voter turnout (2004)	-1.401	[1.504]	-1.622	[1.653]	-1.425	[1.103]
Candidate age (at election)	-0.014***	[0.005]	-0.012**	[0.005]	-0.011	[0.009]
Education of MP	-0.134***	[0.050]	-0.147***	[0.055]	-0.178*	[0.093]
Experience in parliament	-0.111*	[0.060]	-0.096*	[0.055]	-0.102	[0.066]
Number of other contesting candidates with charges	0.572	[0.355]	0.52	[0.339]	0.282	[0.299]
State Dummies	Yes		Yes		Yes	
SE's clustered at	Party level		Party level		State level	
Number of MPs	394		394		439	
Lamda	0.09		0.12		4.28	
Rho	0.57		0.16		0.22	
Prob>Chi2	0.0744		0.1183		0.004	

Notes: Dependent variable as specified above over the full legislative period 2004-2009, MPLADS 2005-2008. Second stage results for Criminal(a) see Table 6. Standard errors are clustered at the party level. *** (**, *) indicates significance at the 1 (5, 10) percent level respectively.