How Much Do Elections Increase Local Policy Responsiveness? Evidence from Elected Police Commissioners[*]

Tobias Nowacki,[†] *Stanford University*

Daniel M. Thompson,[‡] *UCLA*

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Abstract

How much do elections increase local government responsiveness to public preferences? In 2012, directly elected police commissioners replaced a committee of appointed officials overseeing local policing in the UK. We pair police force-level data on arrests, stops, and voting behavior with a continuous difference-in-differences design to estimate the change in responsiveness. We find that, when police forces switched to directly-elected oversight, left-leaning districts reduced their drug arrest share relative to the change in right-leaning districts. We also present evidence that this effect is not concentrated in places with a change in the political party responsible for oversight, suggesting that reelection incentives may play a more important role in determining policy than entry and selection. This finding contributes to an ongoing debate around the role of institutions and oversight in directing and constraining police conduct.

1 Introduction

Democracies use elections as a tool for selecting competent caretakers and holding these representatives accountable. These forces often produce policies that reflect the preferences of the electorate (e.g., Besley and Coate 2003; Erikson et al. 1993; Gailmard and Jenkins 2009; Sances 2016; Tausanovitch and Warshaw 2014), but elections can fail to produce responsive government when voters cannot observe the official's actions or their consequences (e.g., Canes-Wrone, Herron, and Shotts 2001; Rogers 2017; Snyder Jr and Strömberg 2010). Given how hard it can be to monitor government performance, the effect of making an official elected rather than appointed likely declines as the number of offices increases (Berry and Gersen 2009; Ashworth and Bueno de Mesquita 2017). Would changing the oversight of a policy domain from appointed to elected increase policy responsiveness at the current margin? In other words, if our goal were responsiveness, should we increase the number of elections, or would this not help?

We study this question by examining the case of elected police commissioners in England and Wales, a dramatic, countrywide reform to the institutions overseeing police. Prior to 2012, committees made up of local appointees oversaw the performance and budget of 41 police forces in England and Wales. In 2012, each of the 41 police force areas replaced these appointed committees with a single elected official. We combine police force area-level data on arrests with data on voting behavior, police budgets, police personnel, police stops, the partisan composition of the appointed oversight committees, and the party of the elected commissioners. Using a difference-in-differences design, we estimate the differential effect of switching from appointed to elected police commissioners on drug policing across places with different preferences regarding drug prohibition.

We find that left-leaning districts decreased drug arrests noticeably faster and invested more in staff relative to officers than did right-leaning districts once voters elected police oversight directly. These effects are not driven by differential changes in police budgets

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across places and are robust to alternative measures of preferences. These results suggest that the elections made police more responsive to public opinion.

We also present suggestive evidence that the increase in responsiveness comes from a change in incentives rather than a change in partisan control. The two most notable mechanisms for increased responsiveness are a change in the people making policy decisions and a change in the incentives officials face (Caughey and Warshaw 2018; Feigenbaum and Hall 2015; Stimson, MacKuen, and Erikson 1995). Both may be responsible at the same time. We divide the police forces into those where party control switched and those where it did not, and we find that the differential effects on behavior are similar for switchers and non-switchers.

In addition to the literature on local elections, this paper contributes the public and scholarly debate around how communities hold police accountable. Police are often insulated from public pressure and their choices can be hard to monitor and evaluate (Brehm and Gates 1999; Lipsky 1980; Wilson 1978). This has led many scholars and advocates to conclude that institutional reform will not change police behavior. Yet, discrete, targeted policy changes have been successful in changing police behavior (Mummolo 2018). Our findings suggest that changes to police oversight can change police behavior in some conditions.

2 Local Elections and Policy Responsiveness

Elections are a tool for binding policy to public preferences. Political economy models of elections describe an agency relationship in which a representative voter intends to select candidates who have preferences similar to their own. This goal of voters creates an incentive for politicians to behave as though their preferences resemble the voter's even if they do not align (Alt, Bueno de Mesquita, and Rose 2011; Ashworth 2012; Besley and Case 2003; Fearon 1999; Fouirnaies and Hall 2018).[1] When voters cannot observe all policy choices or outcomes,

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[1]It is important to distinguish policy responsiveness — political actors implementing policies closer to the voters' ideal point (Erikson et al. 1993) — from a more general form of responsiveness in which governments

these incentives may move policy away from the representative voter's ideal point (Canes-Wrone, Herron, and Shotts 2001). The median voter's controlling vote can also move policy in a way that disadvantages minority groups (Meltzer and Richard 1981; Sances 2016).

Appointment processes shield officials from broad public preferences to some extent. When voters select a single politician to determine policy in a large number of areas, policy in any given area will favor highly motivated interests (e.g., Besley and Coate 2003; Spoon and Klüver 2014). The official making the appointment may also be better able to monitor the behavior of the appointee while possibly biasing policy toward the preferences of the appointer and away from the median voter (Gailmard and Jenkins 2009).

Since attention is costly, the gains in responsiveness due to switching from appointment to direct election for a particular office depend on how many offices are already elected. Each additional office has a smaller and smaller effect on policy responsiveness. Meanwhile, monitoring costs increase at a constant rate as new offices are introduced. Increasing the number of elected offices improves the fit between policy and voter preferences only to a point where the marginal cost of monitoring is below the benefit (Berry and Gersen 2009).

A number of distinctive qualities of local elections make accountability more difficult: Limited information dampens the candidate-specific signal to the wider electorate (Hopkins 2018; Moskowitz 2018; Rogers 2017) and low turnout increases the influence of highly-motivated voters (Anzia 2011). Still, local elections are often able to achieve some degree of responsiveness (Arnold and Carnes 2012; Christensen and Ejdemyr 2018; Dipoppa and Grossman 2020; Grossman 2014; Payson 2017; Tausanovitch and Warshaw 2014), and local politicians behave as though they are not free to depart from local preferences (Ferraz and Finan 2011; Ferreira and Gyourko 2009; Thompson 2020).

Further, police may be especially insulated from institutional changes. The choices police make on the beat are often hard to monitor, and attempts to change their behavior regularly

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are faster to handle citizen requests or are less corrupt, though the incentives generally operate in the same way (e.g. Christensen and Ejdemyr 2018; Dipoppa and Grossman 2020; Ferraz and Finan 2011; Grossman 2014; Ofosu 2019).

fail (Brehm and Gates 1999; Lipsky 1980; Wilson 1978). Directives that clearly communicate a change in policy and how policy will be monitored can meaningfully change police behavior (Mummolo 2018), but we do not yet have evidence that changing oversight institutions, rather than internal policy, can noticeably change police behavior.

3 Case: Drug Policing Under Elected Commissioners

3.1 Police and Crime Commissioners, A New Elected Office

From 1964 to 2012, oversight of local police in England and Wales was conducted by large committees of appointed officials known as police authorities. The 41 authorities were made up of an odd number of appointees,[2] typically 17. A bare majority of seats were given to elected officials sitting on local authority and county councils, distributed to approximate the partisan makeup of these councils. Vacancies for seats dedicated to elected officials were filled by a vote of the existing authority members. The remaining bare minority of seats were held by local citizens. Vacancies were filled in a three-step process wherein citizens applied, a subset were approved by the national government, and the final choice was selected by the existing authority members from the approved list.

The perceived inability of police authorities to manage local police forces lead to a call for direct election. Writing in The Times in 2005, columnist and now Conservative Member of Parliament and Cabinet Minister Michael Gove argued that "the level of democratic accountability to which the police are subject in Britain is woeful."[3] This attitude extended to a broad enough group of Conservative and Liberal Democrat party members that the parties included it in their manifestos in the run up to the 2010 parliamentary election. In 2011, a bill replacing the police authorities with directly elected police and crime commissioners

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[2]For the purposes of our analysis, we leave out two police forces in London, as their governance structure is non-standard.

[3]https://www.thetimes.co.uk/article/if-crimes-on-the-up-your-police-chief-must-explain-why-or-be-sacked-sl2582qsrns

passed through Parliament. The first commissioner elections were held in November 2012, and commissioners took office shortly thereafter.

Scholars, politicians, and activists had a variety of expectations about the consequences of the institutional change. Many politicians and analysts were optimistic that an institutional change would increase responsiveness and improve the efficiency of the police forces (Caless and Owens 2016; Raine and Keasey 2012). Others raised issues like those discussed above that might lead to the failure of local policy responsiveness. The populations overseen by a single commissioner are large enough that most are meaningfully covered in the media. But, some advocates and scholars worried at the time of the reform that tabloid coverage would offer commissioners incentives to pander (Jones, Newburn, and Smith 2012). Other advocates and scholars worried that the local policies would be overtaken by the national party agendas of the commissioners (Lister and Rowe 2015).

After two full election cycles, evaluations of the performance of elected Police and Crime Commissioners are still divided.[4] Their elections have been marred by unusually low turnout (only 15% in 2012) and subsequent concerns about representativeness. This, in turn, led the then Deputy Prime Minister Nick Clegg – who pushed for implementing the reform in the first place – to brand Police and Crime Commissioners a 'discredited experiment' (Kirkland 2015). [5] Both Labour and the Liberal Democrats supported a return to an appointed board at various times.[6] Conservative Home Secretary Theresa May, on the other hand, hailed the reform's success, highlighting the "role police and crime commissioners are playing in making policing more accountable and effective".[7]

These senior politicians' conflicting claims about the introduction of a new, directly elected office highlights how little reliable knowledge we have about its effects on policy-

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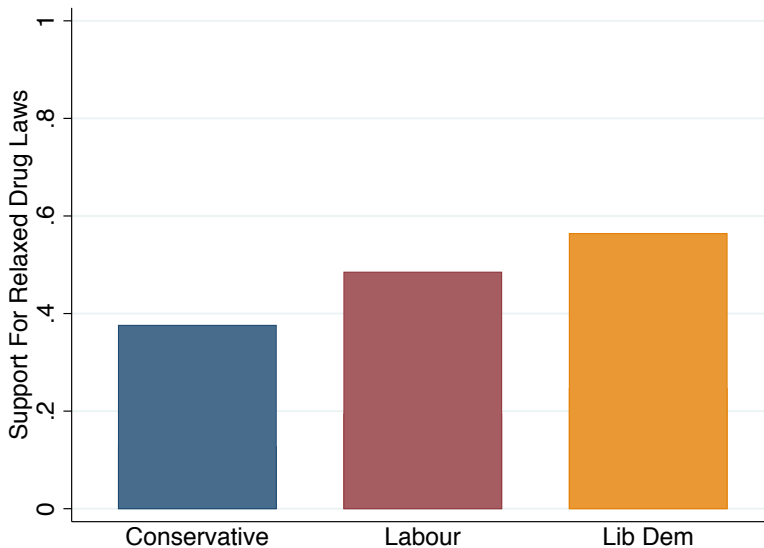[4]The third election of Police and Crime Commissioners was scheduled to be held in 2020, but was delayed for a year due to the COVID-19 pandemic.

[5]https://www.bbc.com/news/uk-politics-29172812

[6]https://www.telegraph.co.uk/news/politics/labour/11111745/Labour-plan-to-scrap-Police-Crime-Commissioners.html

[7]https://www.publicfinance.co.uk/news/2016/02/police-and-crime-commissioners-could-run-free-schools-may-suggests

Figure 1: **Voters for Left Parties in Parliament Favor Relaxed Drug Laws.** Across four YouGov surveys of UK adults, those who reported voting for a Liberal Democrat or Labour candidate in the 2010 parliamentary election were more likely to support decriminalization or legalization of soft drugs such as marijuana than voters for the Conservative party.

making. We use the case of Police and Crime Commissioners to evaluate these claims empirically and investigate more broadly whether a change to a directly elected office brings about greater policy responsiveness.

3.2   Left-Leaning Voters and Crime Policy Preferences

If the direct election of police commissioners improves the match between the preferences of the electorate and the policies officials implement, we should be able to see this in police behavior. But many policing preferences are likely similar across places—most people likely want to see their police arrest those who are credibly accused of serious crimes. To investigate the effect of direct elections on the match between policy and preferences, we need to study outcomes over which preferences vary across police force areas.

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Drug policing is one domain in which we might expect to see different preferences across voters. Given the recent political debates around drug policy in the UK,[8] we would expect Liberal Democrat and Labour voters to prefer more relaxed drug enforcement. Figure 1 presents evidence for this claim. YouGov surveyed thousands of British adults between December 2012 and August 2014 on the subject of drug policy. Across all four waves of the survey, respondents who reported voting for a Liberal Democrat or Labour candidate in the 2010 parliamentary election were more likely to support legalization or decriminalization of soft drugs such as marijuana. We cannot directly test the link between preferences about drug legalization or decriminalization and preferences for relaxed policing of drugs. Instead, the surveys provide suggestive evidence that drug policy is one domain where we might expect a divergence in preferences across parties.[9]

This tendency for left party voters to support drug policy liberalization is also consistent with anecdotal evidence about the stances of police and crime commissioners from those parties (Austen 2016). For example, the Labour commissioner from Durham, Ron Hogg, called for a "radical change" in drug policy and emphasized that his goal was to "protect the most vulnerable and help those with a drug dependency to recover and turn their lives around."[10] The Labour commissioner for the West Midlands, David Jamieson, followed suit with a proposal to "divert those suffering from addiction into treatment and away from the courts" and prescribe "heroin in a medical setting to people suffering from addiction."[11]

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[8]These include a tough criminalization proposal in the early 2000s by the Conservatives (`https://www.telegraph.co.uk/news/uknews/1368775/Tory-crackdown-on-cannabis.html`), the Conservative Prime Minister's stance against cannabis legalization (`https://www.independent.co.uk/news/uk/politics/theresa-may-cannabis-legal-uk-law-william-hague-conservatives-latest-a8406111.html`), a Lib Dem proposal to legalize cannabis (`http://www.bbc.co.uk/newsbeat/article/40819720/lib-dems-under-vince-cable-still-want-to-legalise-cannabis`), and the Labour party leader's support for decriminalizing cannabis (`https://www.independent.co.uk/news/uk/home-news/jeremy-corbyn-cannabis-decriminalisation-ridge-sunday-labour-a8425326.html`).

[9]While overall support for the Green Party in England and Wales is too low to measure drug policy preferences among their voters with usual polling sample sizes, the party has long advocated a very liberal drug policy, and supported cannabis decriminalisation and a move towards a regulated, legal market for cannabis products in the 2010 parliamentary election.

[10]`https://www.bbc.com/news/uk-england-45182442`

[11]`https://www.westmidlands-pcc.gov.uk/practical-proposals-to-tackle-the-scourge-of-drugs-announced-by-police-and-crime-commissioner/`

Drug policy was also an important issue in the discussion of Police and Crime Commissioners. Some drug policy advocacy groups saw the commissioners as a pressure point to change policy.[12] The Guardian also listed changing drug policing as one of the top five reasons the new commissioners might be a successful institution worth keeping.[13]

Another dimension along which left-leaning and right-leaning voters might exhibit different preferences is in their emphasis on personnel matters. In particular, Conservative voters may be more willing to lose some office staff in a trade for more police officers, while Labour voters may be more hesitant to cut staffing costs. We do not have direct evidence for this relationship between personnel preferences and party support in the public. Our best support for this relationship comes from elites during the first police and crime commissioner campaigns, in which a majority of Labour candidates explicitly stated an anti-privatization stance in election statements while no Conservative candidates voiced opposition to privatization (Crawford 2013).

Put together, this suggests a natural proxy for drug and personnel policy preferences: support for left parties in the 2010 parliamentary election.[14]

3.3   Election and Policing Data

In order to test the effect of police and crime commissioner elections on police behavior, we construct two datasets: left party vote shares in the 2010 parliamentary election and drug arrests as a share of total arrests, both by police force area. The election data originally comes from Pippa Norris's collection of 2010 parliamentary election results at the constituency level. We gathered digitized vector boundaries for parliamentary constituencies and police force areas from the British government. Using a spatial merge, we identified the share of each parliamentary constituency that falls within each police force area. When a constituency

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[12]https://volteface.me/feature/drugs-policing-radical-changes-drugs-policy-first-great-
  harvest-police-crime-commissioners/
[13]https://www.theguardian.com/commentisfree/2013/nov/04/police-crime-commissioners-five-
  best-worst-ideas
[14]We also present our main results with support for left parties in the 2012 Police and Crime Commissioner
  election as a measurement of drug and personnel policy preferences in Appendix A.1.2.

falls entirely inside a police force area, I assign all of its votes to that police force area. Three (out of 573) constituencies do not neatly fall completely inside of single police force area. In those three cases, we assign each constituency's votes to a police force area based on the share of the constituency's land area that falls within that police force area's borders. Once we have assigned all of the votes to a police force area, we calculate the total votes cast for each party, and calculate vote shares by party. Following the previous section, We define left party vote share as the share of votes cast for a Labour, Liberal Democrat, or Green party candidate.

We gather drug arrest data from reports issued by the UK Home Office. The reports, typically entitled "Police Powers and Procedures, England and Wales," contain tables listing the number or share of total arrests by offense type and police force area. These annual reports also include tables listing police stops and searches by the reason for the stop and police force area. We calculate the drug-related share of arrests and stops by totaling the arrests or stops for drugs and dividing by the number of arrests or stops for any reason.[15] All of these statistics are calculated by UK fiscal year, running from April to March of the next year. Going forward, the word year shall refer to the year in which the fiscal year ends.

In order to guarantee consistent data quality and run comparable specifications across different outcomes, we restrict our data series to the years from 2008 to 2018. The system used to report arrest statistics changed in 2007, leading to several police forces reporting inaccurate or incomplete data for that year. Although restricting our data series means that we suffer from a loss of precision, we can be more confident in the quality of our data while our results are still statistically meaningful.

3.4   Empirical Strategy: Continuous Difference-in-Differences

For our main results, we estimate regression functions of the form

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[15]A reclassification of offence types in 2015/16 means that some of the reported crime groups may not be comparable across time. However, the 'drug offence' category remained stable over time. Using guidance from the Office of National Statistics about the changes, we constructed other crime categories that are consistent over time.

$$DrugShare_{ft} = \tau LeftShare_f * (Year_t > 2012) + \gamma_f + \delta_t + \epsilon_{ft}$$

where $DrugShare_{ft}$ is the share of arrests or stops primarily for drugs, falling between zero and one, and $LeftShare_f$ is the share of votes going to a Labour, Lib Dem, or Green candidate in the 2010 elections for parliament, also between zero and one. γ_f and δ_t are police force and year fixed effects, respectively. τ is an estimate of the effect of elected police commissioners on the share of drug arrests in further left districts as compared to further right districts.

The design is akin to a classic difference-in-differences design, but with a few modifications. In the standard difference-in-differences set-up, we follow a group of units before and after they are exposed to a treatment and compare them to units never exposed to treatment. Here, we are following places that vote more for left parties before and after commissioners are introduced, and comparing them to places that vote less for left parties, using a continuous measure of left party voting (Angrist and Pischke 2008; Card 1992).[16] For exposition, we will pretend as though there are only two groups.[17] Since both groups are subject to the treatment, we are no longer estimating the average treatment effect on the treated. Instead, we estimate the difference in the conditional average treatment effect (CATE) between these two groups. This differential effect is identified under the usual difference-in-differences assumption, that the differences in police behavior across these places would have remained the same had police and crime commissioners not been introduced. This assumption is not directly testable, but it can be interrogated by assessing whether the police behavior is moving in parallel prior to the introduction of commissioners.

The difference in CATEs tells us the degree to which the policy pushed left-voting places and right-voting places in opposite directions. This is what we would expect if left-voting places prefer a different policy from right-voting places and elected officials are better at

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[16]For examples of recent work using this research design in political science, see Feigenbaum and Hall (2015) and Lueders, Hainmueller, and Lawrence (2017).

[17]The intuition we gain from the two-group cases generalizes to the continuous case.

achieving the outcomes residents prefer. The differential effect does not tell us whether the introduction of elections had the same effect everywhere. For example, since we would expect elections to induce government officials to work harder everywhere, the differential effect would not be an appropriate estimand because it could mask effects on effort, even very large effects.

Classic cluster robust standard errors are known to be biased in small samples (Cameron, Gelbach, and Miller 2008). Given the limited number of police forces, we report standard errors from a clustered bootstrap procedure that tends to perform better in smaller samples, clustering on police force.[18]

3.5 The Reform in the Context of Austerity

The introduction of directly elected Police and Crime Commissioners in England and Wales occurred against the backdrop of severe financial austerity policies implemented by the central government in the aftermath of the 2008-09 Great Recession. Local governments and police authorities depend on national government grants, which had been cut back significantly: between 2011 and 2015, police forces' central government funding, on average, decreased by 25% in real terms.[19] At the same time, police authorities' capacity to raise local revenue through local revenue streams was limited by a strict cap on tax precept increases.

A key concern is that police authorities in more urban, left-leaning places, which experienced more severe revenue shortfalls, also changed their policing and enforcement policies in response to austerity. Funding cuts affected poorer and more left-leaning areas more harshly (Fetzer 2019). Any potential change in drug policy that we attribute to increased responsiveness might actually be an impact of disproportionately severe austerity measures instead.

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[18]Despite the concerns described in Cameron, Gelbach, and Miller (2008), the estimated standard errors are similar using the clustered wild bootstrap procedure they describe, the blocked bootstrap procedure in Bertrand, Duflo, and Mullainathan (2004), and the classic cluster robust standard errors.

[19]https://www.nao.org.uk/report/financial-sustainability-of-police-forces-in-england-and-wales/

If this is the case, we run the risk of having our estimates of changes in responsiveness confounded.

To mitigate this concern, we report specifications with revenue decile-by-year fixed effects, where we group authorities into deciles by 2012 (pre-treatment) total revenue.[20] For further robustness, our preferred specification includes year-specific slopes on police forces' 2012 total revenue (year-by-revenue IFEs) instead. These adjustments control for (linear) pre-trend differences in declining revenue that might drive differences in outcomes. In Section 4.2, we document that when we include said fixed effect specifications, the difference in post-reform revenue between left-voting and right-voting places disappears.

# 4   Elected Police Respond to Public Preferences

4.1   Drug Policing Reduced in Left Stronghold Relative to Right Strongholds

An initial look at the raw data on policing suggests that the most left-voting places had a steeper drop in drug policing after the introduction of Police and Crime Commissioners than did right-voting places. Figure 2 captures this pattern. Each dot represents a police force; the horizontal axis captures the parliamentary vote share for left parties in 2010, while the vertical axis denotes the change in the average share of drug arrests (of all arrests) between the pre-reform period (2008 - 2012) and the post-reform period (2013 - 2016). The solid line marks the line of best fit through the data points. We see that after the introduction of elected Police and Crime Commissioners, the average share of drug arrests increased in the most right-voting places, while it decreased in the most left-voting places.

This relative change in drug arrest behavior holds up across our difference-in-differences analyses. Table 1 reports the formal estimates of the change in total arrests in capita

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[20]Our data comes from the annual *Value for Money* reports by Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services (HMICFRS).

Figure 2: **More left-leaning places experienced a bigger drop in drug arrest shares after the reform.** Police authorities with higher vote shares for Labour, Liberal Democrats, and the Green Party in the 2010 general election experienced a smaller increase (or even decrease) in the average share of drug arrests after the reform, compared to the average share of drug arrests before the reform.
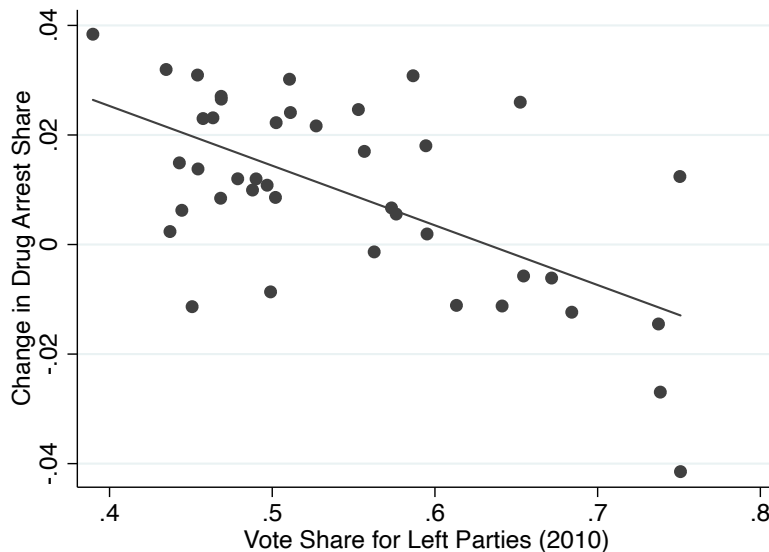
(columns 1-3) and the share of drug arrests (colums 4-6).[21] For either outcome, the first column presents the estimates from a standard two-way fixed effects specification as discussed in section 3.4. In the next respective column (2 and 5), we add year-by-revenue decile fixed effects in order to control for potential differences in the outcome due to austerity measures. Finally, we also report estimates when including year-specific slopes on 2012 total revenue (columns 3 and 6). Across all regressions, we retain unit-specific fixed effects.

Across all six columns, the differential effect of elected Police and Crime Commissioners is substantively large and statistically distinguishable from zero at conventional levels. To give a sense of the magnitude, we would expect total arrests per capita to drop by about 0.002 when moving from the 25th percentile of left-voting police forces to the 75th.[22] Given a mean value of 0.018 arrests per capita, this represents an approximately 11% effect relative to the average arrest per capita rate. Conversely, for the same movement from the 25th

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[21]For completeness, we also report the change in the share of other arrest categories in Appendix A.1.5.

[22]The 25th percentile had a left voting share of 47%, while the 75th percentile had a left voting share of 60%, leaving us with a movement of 13 percentage points.

Table 1: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Make Fewer Arrests per Capita and Reduce Drug Arrest Share.**

	Arrests Per Capita			Drug Arrest Share [0,1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Left Share	-0.013	-0.021	-0.017	-0.109	-0.091	-0.061
	(0.005)	(0.008)	(0.007)	(0.028)	(0.038)	(0.034)
Mean	0.018	0.018	0.018	0.082	0.082	0.082
# Forces	41	40	40	41	40	40
# Years	11	11	11	11	11	11
# Obs	448	437	437	448	437	437
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2019.

to the 75th percentile in left-voting authorities, we would expect a decrease of almost 0.8 percentage points in the share of drug arrests, which, relative to the mean value (0.082), translates to an effect size of just below 10 per cent.

These linear effect estimates are simple and have the best power to detect an effect if the effect of switching to elected police oversight is approximately linear in local preferences. But, if the effect is non-linear, these linear estimators can produce substantively misleading results. In Appendix A.1.3, we replicate Table 1 but using a treatment variable binned into terciles following the advice in Hainmueller, Mummolo, and Xu (2019). The results from this analysis are substantively similar.

Table 2: **Police Forces in Left and Right Districts Had Similar Budget Cuts Under Elected Police Commissioners After Adjusting for 2012 Revenue.**

	Revenue Per 1k Pop			Central Gov Rev Per 1k Pop			Local Tax Rev Per 1k Pop		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × Left Share	-33.7	-16.4	2.3	-25.8	-6.0	10.6	-4.9	-18.8	-16.1
	(15.2)	(27.0)	(19.1)	(11.8)	(17.0)	(12.3)	(8.1)	(14.3)	(10.9)
Mean	189.9	189.9	189.9	134.1	134.1	134.1	56.1	56.1	56.1
# Forces	40	40	40	40	40	40	40	40	40
# Years	10	10	10	10	10	10	10	10	10
# Obs	397	397	397	397	397	397	397	397	397
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2018.

4.2 Differential Effects Not Driven by Austerity

During the period when police and crime commissioners were coming into office for the first time, the UK government was making large budget cuts. Police were not immune. In this section, we follow up on the concerns discussed in Section 3.5 and demonstrate the differential effect of austerity on police forces' revenue. Budget cuts could affect police by reducing their capacity for making more arrests on more serious crimes. Or, perhaps, it could mean that police cut back on the community policing that often results in drug arrests. Either way, if the effects of these cutbacks are not constant across places, they could produce a change in drug arrest shares unrelated to the introduction of police and crime commissioners.[23]

Table 2 reports formal estimates of whether left-leaning police authorities suffered from a greater shortfall of funding after the introduction of elected Police and Crime Commissioners. Columns 1 to 3 report the effect of left share on total revenue; columns 4 to 6 use total

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[23]For recent reporting on how these cuts influenced police, see Fewer Officers, More Calls: U.K. Police Are Stretched by Austerity in the New York Times (https://www.nytimes.com/2019/02/01/world/europe/uk-police-crime-austerity.html).

revenue from the central government as the outcome of interest; and columns 7 to 9 report the estimates with local tax revenue as the outcome. All three outcomes are adjusted for population (revenue per 1,000 population). Across all three outcomes, the specifications are the same as in Table 1. First, we report the estimate with a simple two-way fixed effect. Next, we include revenue decile fixed effects. Finally, we swap in revenue-specific yearly slopes.

We find significant differential effects of austerity on police forces' budgets, which largely disappear when we add our preferred control in the form of year-specific slopes on 2012 total revenue. In the unadjusted, two-way fixed effects specification (column 1), moving from the 25th percentile to the 75th percentile in terms of left voting share predicts a roughly 2% decrease in total revenue relative to the mean of £189.9 per 1,000 population. The estimates become statistically indistinguishable from and shrink towards zero when we include either of our two revenue-adjusting fixed effects specifications (columns 2 and 3). The same pattern holds true for central government revenue: here, too, the coefficients decrease in magnitude and become statistically insignificant at conventional levels when including revenue fixed effects. When we use local tax revenue as an outcome, the adjustment appears to be somewhat less effective, although the coefficient is still statistically indistinguishable from zero at conventional levels, even when including year-specific slopes on 2012 revenue.

These results suggest that the inclusion of year-specific slopes on 2012 total revenue might be an effective way of controlling for police forces' differential exposure to austerity-related budget cuts. When we include our revenue adjustment in the regression specification, the share of left votes no longer predicts a meaningful difference in police forces' post-reform revenue. The specification with year-by-revenue decile fixed effects and, better still, year-specific slopes on 2012 revenue is therefore a plausible strategy to account for any post-reform changes in crime outcomes that are the consequence of harsher austerity measures in left-leaning places, rather than increased responsiveness.

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4.3 Estimates Are Similar After Matching On Pre-2012 Trajectories

While Table 2 confirms that, once we include our preferred fixed effects specification, police budgets in left-wing and right-wing districts are moving approximately in parallel, police behavior could be changing differently across districts for other reasons unrelated to the adoption of directly elected oversight. If, for example, drug policing was polarizing as an issue over time, our difference-in-differences estimator would be biased, leading us to think directly elected oversight caused more responsive policing when it would have happened regardless.

To address these concerns, we implement a matching procedure that allows us to get the best possible match of pre-treatment trajectories between relatively left-wing and right-wing force areas. This approach, akin to a pair blocking exercise (Imai et al. 2009), finds the set of police force pairs that minimizes the distance between pair members in terms of the full time series of drug arrest share prior to 2012.[24] We are able to construct pairs such that the difference between drug arrest share between the average within-pair left-wing district and average within-pair right-wing district is always between -0.0035 and 0.0021 from 2008 to 2012 with an average difference of -0.00001 across all five years. For a sense of scale, this average difference is approximately two orders of magnitude smaller than the differential effect we estimate using this matching approach.

We then make within-pair comparisons, estimating the post-2012 split in drug arrest share between the relatively left-wing member of the pair and the relatively right-wing member of the pair. We do so by estimating regressions that include year-by-pair fixed effects, isolating only within-pair differences over time.

We find that, while the gap estimated in this analysis is somewhat smaller than the one we estimated in our earlier analysis, the direction of the relationship between drug arrests and

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[24]Our matching approach is closely related to Hazlett and Xu (2018); Imai, Kim, and Wang (2018) but finds matched pairs when the treatment variable is continuous. We discuss the procedure in more detail in the Appendix.

left-party voting is the same, and the induced gap in drug arrests continues to be substantial. The relationship between left-party voting and a drop in per capita arrest rates is no longer negative within matched pairs, though the estimates are too noisy to rule out a negative relationship on the scale of what we report in Table 1. Table A.5 in the appendix presents the formal estimates. We report estimates both using a continuous measure of the left share as the treatment and a binary variable flagging the left-most district as the treatment. Both approaches produce very similar estimates of the differential effect after accounting for the average within-pair left vote share difference between the left-most and right-most district.

4.4 Drug Stops May Have Declined in Left Stronghold Relative to Right Strongholds

During our study period, many drug arrests began as a street or vehicle search. UK police are permitted to stop and search people when they have "reasonable grounds to suspect" that you are carrying illegal drugs.[25] This offers one way that police forces may shift priorities away from drug enforcement: limiting the number of searches or reducing the share where drugs are the focus.

We find some suggestive evidence that drug stops may have declined as a share of stops in left-leaning districts relative to right-leaning districts. We do not find consistent evidence that police in left-leaning districts reduced overall searches faster than police in right-leaning districts. Table 3 reports our formal estimates. The columns use the same specifications as Table 1. Across all columns, our estimates are too noisy to rule out large effects or null effects, once we have adjusted for the potential confounding from budgets changing differently in left- and right-leaning districts. For example, the estimate in Column 3 has a point estimate that implies, relative the 25th percentile left-share district, the 75th percentile left-share district reduced stops 0.65 stops per 1,000 residents per year. This is approximately 6.5% of the stop rate for the average force in the average year. Yet the 95% confidence interval

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[25]https://www.gov.uk/police-powers-to-stop-and-search-your-rights

Table 3: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Make Fewer Stops per Capita and Reduce Drug Stop Share.**

	Stops Per Capita			Drug Stop Share [0,1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Left Share	-0.024	-0.012	-0.005	-0.333	-0.184	-0.140
	(0.010)	(0.017)	(0.013)	(0.109)	(0.174)	(0.154)
Mean	0.010	0.010	0.010	0.516	0.516	0.516
# Forces	41	40	40	41	40	40
# Years	10	10	10	10	10	10
# Obs	409	399	399	409	399	399
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2019.

ranges from a relative drop in stops in left-leaning places of 3.96 stops per 1,000 residents up to a relative increase of 2.66 stops per 1,000 residents—a 40% or 26% difference over the average stop rate, respectively. Our estimates of the differential effects on drug stops are not as noisy—our point estimate in Column 6 is a relative decline in drug stop share in left-leaning districts of 3.5% of the typical drug stop share with a confidence interval including a drop of 11.1% and an increase of 4.1%–but it is still noisy relative to our estimates of on arrests.

Overall, our findings are consistent with left-leaning police forces shifting away from drug stop and searches as part of the way that they reduced drug arrests relative to right-leaning forces, but the evidence is only suggestive.

Table 4: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Shift Personnel Away from Officers, Toward Staff.**

	Employees Per 1k Pop			Officer Share			Staff Share		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × Left Share	-1.054	-0.907	-0.653	-0.091	-0.119	-0.157	0.082	0.133	0.151
	(0.366)	(0.467)	(0.503)	(0.069)	(0.063)	(0.075)	(0.063)	(0.064)	(0.058)
Mean	3.468	3.468	3.468	0.578	0.578	0.578	0.063	0.063	0.063
# Forces	41	40	40	41	40	40	41	40	40
# Years	10	10	10	10	10	10	10	10	10
# Obs	410	400	400	410	400	400	410	400	400
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No	Yes	No	No
Year × Revenue Tercile FEs	No	Yes	No	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Revenue Tercile divides the police forces into terciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2018.

4.5 Shift Toward More Officers, Fewer Staff in Right Stronghold Relative to Left Strongholds

As we discussed in Section 3.2, Labour politicians actively campaigned against staff cuts and privatization, which would overwhelmingly affect non-officer employees. Conservative politicians did not actively speak out on this issue. While we cannot directly assess whether voters in left- and right-leaning districts have meaningfully different preferences over police personnel matters, the party stances on these issues suggest that right-leaning district might be more open to staff cuts and privatization.

Accordingly, we measure how much the introduction of directly elected police oversight changed the gap between left- and right-leaning districts in the composition of police office employees. We find that right-leaning districts increased the share of employees who were officers and reduced the share who were non-officer staff relative to left-leaning districts. We also find that, while left-leaning places reduced the number of people they employ by a larger

amount, these differences are mostly due to the differential effect of austerity and go away when we adjust for employment trends based on pre-treatment revenue levels.

Our preferred point estimate, reported in Column 9 of Table 4, implies that, relative to a 75th-percentile left-share district, a 25th percentile district (further to the right) reduced the share of employees who are staff by nearly 2 percentage points. 6.3% of police employees are staff in the average police force in the average year; a nearly 2 percentage point change is quite substantial. The 95% confidence interval for this estimate ranges from a 0.4 percentage point differential effect to a 3.4 percentage point differential effect.

5   Accountability or Selection?

The two primary mechanisms for policy responsiveness are a change in the ideological composition of an office (selection) and a change in the incentives the officers face (accountability). These proposed mechanisms raise a natural question: is the change in policy mostly located in places where the ideology of the officer overseeing the police changed, or was the change in policy broadly felt?

In order to tease this apart, we find all police forces for which the party of the overseeing official changed. We do this by constructing an additional dataset that notes the party affiliations of all authority members prior to the introduction of commissioners, and we pair it with data on the party of the commissioners. We then remove the authority members who are independent community members and focus on the political members. We locate the median party member for each authority, labeling Labour, Lib Dem, and Green members as -1, Conservative and UKIP members as 1, and all others as 0. This allows us to compare the party of the median authority member to the party of the commissioner.

Very few police forces go from having a left-wing majority to a right-wing commissioner or vice versa, but many switch from a partisan authority to an independent commissioner or switch from an independent authority to a partisan commissioner. Table A.6 reports

the share of police forces by their original authority median and the party of their elected commissioner. More than half of the police forces controlled by a Conservative majority in their authority elected and independent as commissioner.

We find that the differential change in drug arrest share and arrests per capita is similar in places where the party controlling oversight changed and places where it did not. Table 5 presents our formal estimates. The columns match the columns reported in Table 1, but we break out the differential change in drug arrest share for forces that switch party control and those that do not. The fact that estimates on the second row hover around zero suggests that the party in charge of overseeing the police force is not the most important factor in producing policy responsiveness.

These results do not rule out selection as an important mechanism by which voters can produce policy responsiveness. It is possible that independents have considerable ideological overlap with partisans on matters of drug policing or that there is considerable within-party heterogeneity among officials. If either of these facts are true, voters may be getting the policy the prefer by selecting the particular politician within a given party that shares their preferences, and party switching is not an important measure of this behavior.

Still, this analysis rules out one of the most commonly cited selection-based mechanisms for policy responsiveness and suggests that reelection incentives may be a more important reason for the responsiveness I observe.

6   Conclusion

This article investigates an example of the relatively rare occurrence of adding a powerful elected office in a mature democracy. While this does not happen often, these cases are useful because they give us a window into whether elections are producing the responsiveness we expect. These results suggest that, at least in a context where there are relatively few powerful locally-elected officials, adding a new one still improves policy responsiveness. This

Table 5: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Make Fewer Arrests per Capita and Reduce Drug Arrest Share.**

	Arrests Per Capita			Drug Arrest Share [0,1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Left Share	-0.008	-0.013	-0.012	-0.096	-0.085	-0.063
	(0.005)	(0.008)	(0.006)	(0.021)	(0.037)	(0.035)
Switch × Post × Left Share	-0.000	-0.002	0.000	0.016	0.004	0.014
	(0.002)	(0.002)	(0.002)	(0.008)	(0.013)	(0.008)
Mean	0.021	0.021	0.021	0.082	0.082	0.082
# Forces	41	40	40	41	40	40
# Years	8	8	8	8	8	8
# Obs	328	320	320	328	320	320
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Switch is a dummy variable indicating whether partisan control of police oversight changed after PCCs were introduced. Data from 2008 to 2016.

does not rule out welfare-reducing reasons for improved responsiveness such as pandering, but it rules out a failure to respond to citizen preferences. And this result does not necessarily imply that the reason for the drop in drug arrest share in left-wing places relative to right-wing places was the political preferences of the electorate. Still, from the perspective of the residents living in these police districts in England and Wales, the effects are observationally equivalent with reform-induced responsiveness.

This case helps to clarify something that often gets lost in work on responsiveness: the appropriate standard by which to evaluate an institution is in comparison to other viable institutions. Here, we are able to compare an appointed committee with a directly elected official. Other cases will provide a different comparison. Putting together studies of the con-

sequences of adopting different institutions is necessary to test the predictions from political economy models about when elections succeed to produce responsive government.

Responsiveness was one of the core justifications for electing police commissioners that advocates articulated. Nick Herbert, the police minister during the transition to police and crime commissioners and an advocate for the change, wrote prior to the change:

> "Over the years, the police have become estranged from the municipalities from which they sprang and increasingly look to the Home Office. ... From the first elections in May next year, the public will have a real say over how their area is policed."[26]

Herbert also highlighted the mandate of police and crime commissioners to "tackle drugs and work with local authorities and agencies." Many of the explanations for why this goal may not be achieved were also evident at the time, including in a Guardian editorial in the months ahead of the first commissioner elections:

> "So far, barely a quarter of voters even know that elections for the new commissioners will take place in November. There are serious concerns about turnout not being high enough to give the bodies legitimacy. There are worries about the caliber of candidates, and the rules by which they will fight the elections."[27]

Our findings suggest that this change had at least one observable part of the its intended effect. The big remaining question is whether this came at a cost in terms of unobservable policy choices and whether elections improved the quality oversight or the effort overseers exerted.

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[26]https://www.telegraph.co.uk/news/uknews/crime/8410429/Its-time-for-you-to-have-a-say-on-policing.html

[27]https://www.theguardian.com/commentisfree/2012/jan/08/police-crime-commissioners-ratcatcher-vote

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Online Appendix

Intended for online publication only.

Contents

A.1 Additional Statistical Results

A.1.1 Drug Arrest Share by Tercile of Left-Party Voting

In the body of the paper, I presented a figure illustrating the research design by breaking the police forces into terciles of left-party voting and plotting the average drug arrest share by tercile. I followed the procedures in the pruned columns of Table 1 for that figure by dropping the two police forces that have unusually high drug arrest shares prior to treatment and throw off the parallel pre-trends. Figure A.1 presents the same figure without pruning.

Figure A.1: **Substantial Drop in Drug Arrest Share in Left-Leaning Districts Relative to Other Districts.** Comparing the top tercile of districts in terms of Labour, Lib Dem, and Green party voting in the 2010 parliamentary election to the bottom and middle terciles, districts favoring left wing and center left candidates more saw a larger drop in drug arrest share following the introduction of police and crime commissioners. Following the unpruned columns in Table 1, the Dyfed-Powys and Merseyside police forces are included in the plot despite to their unusually-high pre-treatment drug arrest share values.
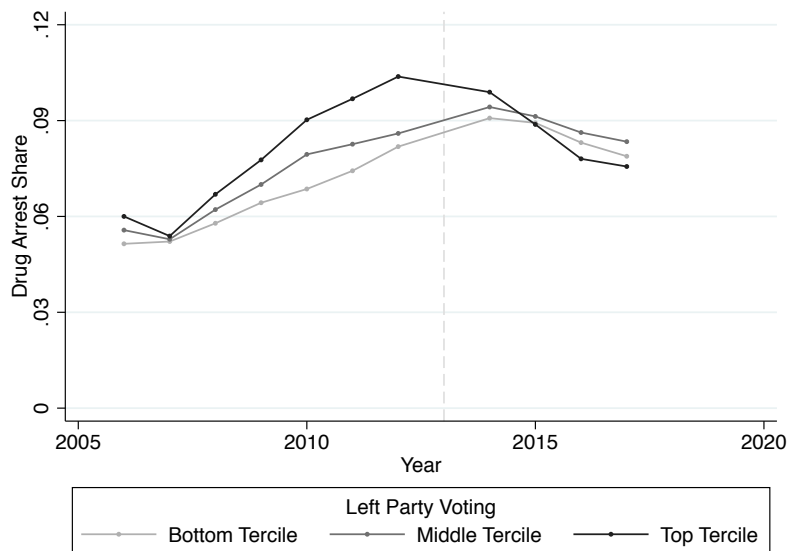
A.1.2 Results Using Alternative Measures of Ideology by District

In the body of the paper, we present results using left party voting in the 2010 House of Commons general election as a measure of drug preferences. As a check, we re-ran the main analysis using two additional measures of the ideology: voting for left parties in the 2012 commissioner election and a survey-based measure of drug policy preferences.

We also gathered data for all local elections in England and Wales during the period of interest. We aggregate the vote totals in local elections between 2009 and 2012 by police force area,[28] and plot their relationship with 2010 parliamentary vote totals in Figure A.2. The plot shows that the two vote share measures are highly related, suggesting that our measure of left-leaningness holds up across different types of elections.

Table A.1: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts (Measured by PCC Election Share) to Make Fewer Arrests per Capita and Reduce Drug Arrest Share.**

	Arrests Per Capita			Drug Arrest Share [0,1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Left Share	-0.007	-0.009	-0.006	-0.074	-0.058	-0.040
	(0.005)	(0.006)	(0.005)	(0.022)	(0.025)	(0.024)
Mean	0.018	0.018	0.018	0.082	0.082	0.082
# Forces	41	40	40	41	40	40
# Years	11	11	11	11	11	11
# Obs	448	437	437	448	437	437
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2012 election for Police and Crime Comissioner in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2019.

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[28]We use the total votes across multiple years because of the staggered pattern of local elections in the UK. If we only used one year, we would omit parts of the country that did not hold local elections in said year.
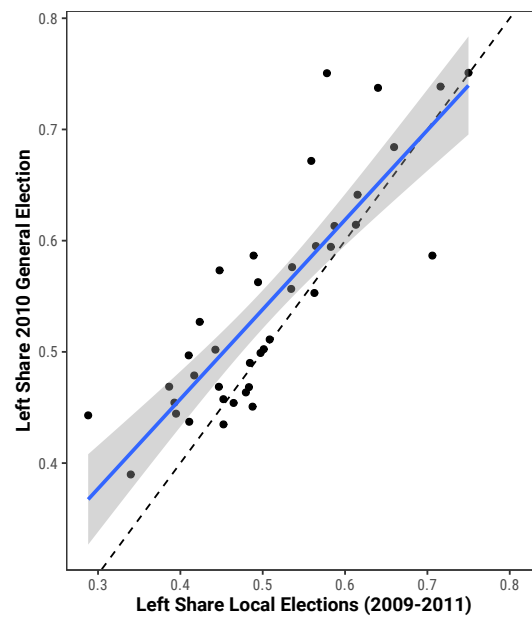
Figure A.2: **The Combined Left Share of Votes in Local Elections (2009-2011) is Similar To the 2010 Parliamentary Election Vote Share.**

A.1.3 Main Results with Binned Treatment Variable

For the main analysis, we present results using a continuous measure of local preferences. This provides a simple summary statistic and is powerful test if the effect of switching to elected police oversight is approximately linear in local preferences. But, if the effect is non-linear, this linear estimator produce substantively misleading results.

Following Hainmueller, Mummolo, and Xu (2019), we have binned the treatment variable into three equally-sized bins as a robustness check. The results, reported in Table A.2, are in line with the main results using a linear estimator.

Table A.2: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Make Fewer Arrests per Capita and Reduce Drug Arrest Share.**

	Arrests Per Capita			Drug Arrest Share [0,1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Mid Left Share	-0.000	-0.002	-0.000	-0.005	0.000	0.001
	(0.001)	(0.002)	(0.001)	(0.005)	(0.008)	(0.006)
Post × High Left Share	-0.002	-0.003	-0.002	-0.021	-0.015	-0.007
	(0.001)	(0.002)	(0.002)	(0.007)	(0.009)	(0.007)
Mean	0.018	0.018	0.018	0.082	0.082	0.082
# Forces	41	40	40	41	40	40
# Years	11	11	11	11	11	11
# Obs	448	437	437	448	437	437
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	No	No	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No	No	Yes	No
Year × Revenue IFEs	No	No	Yes	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Mid Left Share is a binary variable with value one if the police force's total vote share for Labour, LibDems, and Green candidates in the 2010 parliamentary election fell into the middle tercile. High Left Share is a binary variable with value one if the police force's total vote share for Labour, LibDems, and Green candidates in the 2010 parliamentary election fell into the top tercile. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2019.

A.1.4 Differential Effect Not Driven by Changes in Capacity, Adjusting for Total Arrests

In the body, we presented estimates of the differential effect of commissioners after adjusting for the number of full time employees each office has. In Table A.3, we adjust for total arrests and reach a similar conclusion.

Table A.3: **Elections Cause a Decrease in the Share of Arrests for Drugs in Left-Leaning Districts After Adjusting for Changes in Total Arrests.**

	Drug Arrest Share [0,1]		
	(1)	(2)	(3)
Post × Left Share [0, 1]	-0.100	-0.075	-0.049
	(0.027)	(0.036)	(0.032)
Arrests Per Capita	0.681	0.800	0.705
	(0.441)	(0.591)	(0.455)
Mean	0.082	0.082	0.082
# Forces	41	40	40
# Years	11	11	11
# Obs	448	437	437
Force FEs	Yes	Yes	Yes
Year FEs	Yes	No	No
Year × Revenue Decile FEs	No	Yes	No
Year × Revenue IFEs	No	No	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 parliamentary election in the police force area. Revenue Decile divides the police forces into deciles based on total revenue as of 2012. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2019.

A.1.5　Arrest Shares by Crime Type

In the table below, we report the differential effect of the introduction of elected Police and Crime Commissioners on shares of different arrest categories (beyond drug arrests).

Table A.4: **Elected Police Commissioners Caused Police Forces in Left-Leaning Districts to Reduce Drug Arrest Share, Increase Disorder-Related Arrest Share (Other), 2008 to 2015.**

| | Arrest Share [0,1] | | | | | | | | |
	Drug (1)	Violent (2)	Sex (3)	Robbery (4)	Burglary (5)	Theft (6)	Damage (7)	Fraud (8)	Other (9)
Post × Left Share	-0.049	-0.064	-0.013	0.009	0.038	0.047	-0.027	-0.004	0.063
	(0.041)	(0.101)	(0.011)	(0.007)	(0.020)	(0.040)	(0.031)	(0.019)	(0.116)
Mean	0.082	0.336	0.030	0.018	0.071	0.220	0.090	0.019	0.134
# Forces	40	40	40	40	40	40	40	40	40
# Years	7	7	7	7	7	7	7	7	7
# Obs	280	280	280	280	280	280	280	280	280
Force FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year × Revenue IFEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors reported in parentheses estimated using 1,000 bootstrap samples blocked by police force. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the total vote share for Labour, Lib Dem, and Green candidates in the 2010 election for Parliament in the police force area. Year × Revenue IFEs are year-specific slopes on 2012 total revenue. The first commissioner election year, fiscal year 2013, is held out of the analysis since the treatment starts in the middle of the year. Data from 2008 to 2015.

A.2 Matching Procedure and Results

A.2.1 Description of the Matching Procedure

The matching procedure we describe in Section 4.2 procedes in three steps:

1. *Calculate the distance between each unit and every other unit.* We calculate this distance by calculating the difference between the two units in every year between 2006 and 2012, squaring these differences, and adding them. This yields a single distance measure between units, in this case the Euclidean distance. In a separate version, we add a weight to the squared differences in which 2006 received a weight of 1/7, 2012 receives a weight of 1, and the weight increases linearly with year over the intervening period. This penalizes distances closer to the policy change more.

2. *Drop the unit with the largest minimum distance it and any other unit.* Since there are an odd number of units, we drop the unit with the worst ability to match from the sample.

3. *Run nonbipartite matching algorithm to find pairs that minimize the total of within-pair distances.* Following the recommendation of described in Ryan T Moore and Keith Schnakenberg's discussion of blockTools, we use the nbpMatching package to find the pairs that minimize this total distance.

A.2.2 Formal Matched Analysis Results

Table A.5 presents the formal results from our matching analysis. The first row presents estimates analogous to those in the first row of Table 1. The second row removes the linearity assumption and estimates the average change in the drug arrest share gap between the relatively left-wing force and the relatively right-wing force within each pair. Looking at the fourth row, we can compare the estimates in the first and second row. The average distance between the relatively left-wing pair member and the relatively right-wing member is 8.4 percentage points in terms of left party voting. If we multiply that by the changed gap of 0.044, we get an expected average within-pair difference of about 0.0037. This suggests that, while the linear estimator increases our power, the substantive interpretation of the effects is similar across both approaches.

Table A.5: **Elected Police Commissioners Caused a Decrease in the Share of Arrests for Drugs in Left-Leaning Districts, Comparisons Within Matched Pairs.**

|	Arrests Per Capita				Drug Arrest Share [0,1]			
Post * Left Share [0,1]	0.007	0.007			-0.060	-0.044		
	(0.004)	(0.004)			(0.021)	(0.017)		
Post * Most Left in Pair {0,1}			0.0009	0.0010			-0.0060	-0.0034
			(0.0005)	(0.0006)			(0.0034)	(0.0033)
Outcome Mean	0.018	0.018	0.018	0.018	0.080	0.080	0.080	0.080
Avg Diff btwn Left and Right in Pair	0.082	0.084	0.082	0.084	0.082	0.084	0.082	0.084
# Forces	40	40	40	40	40	40	40	40
# Years	11	11	11	11	11	11	11	11
# Obs	434	434	434	434	434	434	434	434
Force FE	Y	Y	Y	Y	Y	Y	Y	Y
Year × Matched Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Weighted Matching	N	Y	N	Y	N	Y	N	Y

Cluster robust standard errors clustered by police force in parentheses. Post is a binary variable taking the value one for years after 2013. Left Share is a share variable falling between zero and one that reports the vote share for Labour, Lib Dem, and green candidates in the 2010 election for parliament. Most Left is a flag taking the value one for each police force area that has a higher value of Left Share within matched pair. Matched pairs are constructed to minimize the total within-pair distance between selected pairs of police forces in terms of drug arrests share from 2008 to 2012. Weighted Matching indicates whether the matching penalizes distances closer to 2012 more than distances earlier in the time series. The first commissioner election year, 2012, is held out of the analysis. Data from 2008 to 2019.

A.3 Descriptive Results

A.3.1 Map of Parliamentary Voting by Police Force Area

Our primary measure of preferences comes from parliamentary election data. I aggregate the votes to the police force area level using a geographic merge. Since nearly all parliamentary constituancies fit neatly inside a police force area, this is mostly just a technique for finding which constituencies go with which police forces efficiently. Below, we plot a map of police force boundaries, with police forces shaded by the left party vote share.

Figure A.3: **Map of Left Party Voting for Parliament in 2010 by Police Force Area.**
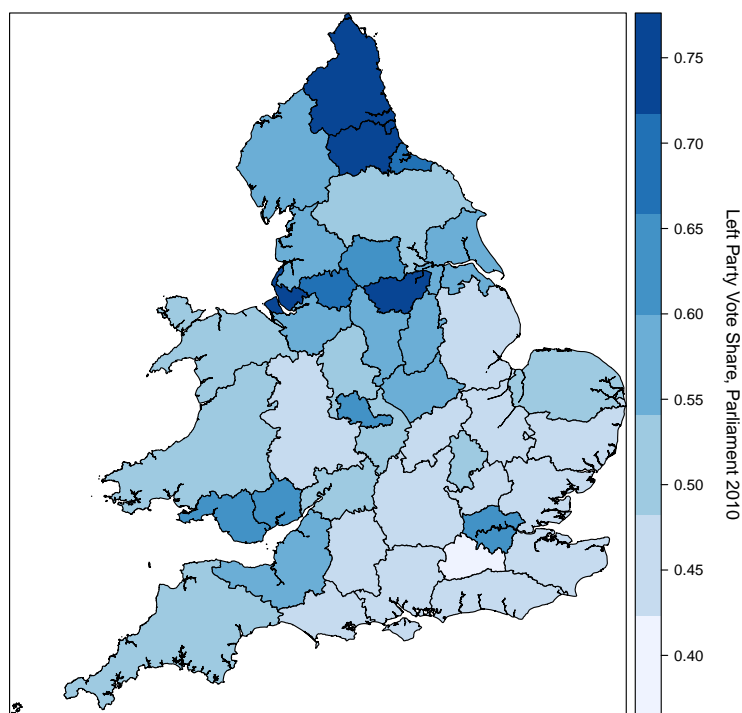
A.3.2 Party of Authorities vs Commissioner

Table A.6: **Share of Police Forces by Partisan Control, Police Authority and Police and Crime Commissioners.**

		Commissioner Party		
		Left	Middle	Right
Authority	Left	0.24	0.03	0.11
Party	Middle	0.03	0.03	0.11
	Right	0.00	0.26	0.21

Each cell reports the share of police forces by the party controlling the police authority in 2012 and the party of the police and crime commissioner in 2013. The party controlling the police authority is the median party of elected members with conservatives defined as 1, Labour members, greens, and liberal democrats defined as -1, and all others defined as 0.