The Kim Foxx Effect *Revisited*

Abstract

A wave of reform-minded prosecutors has been elected promising to reform a broken criminal justice system. Cook County's State Attorney Kim Foxx is committed to reducing her system's punitiveness and is regarded as one of the "country's most prominent progressive prosecutors".[1] One key policy reform taken by Foxx is to only prosecute felony shoplifting for thefts greater than 1,000 dollars. We use newly available public felony and misdemeanor case data provided by The Circuit to investigate the full policy impact on retail thefts.[2] We employ a Bayesian interrupted time series design using a python port of Causal Impact.[3] Testing the policy impact, we provide estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged compared to the previous State's Attorney Alvarez. We improve on a previous estimate of Foxx's policy with advanced modeling and incorporation of misdemeanor data.[4]

Introduction and Literature Review

Although prosecutors lack the authority to change the law, they have tremendous authority and discretion in deciding whom to charge and how aggressively to charge.

Newly-elected progressive DAs are using their authority to decriminalize certain non-violent offenses or reduce the severity of offenses and sentence level. DA Rachel Rollins (Suffolk County, Massachusetts) decriminalized shoplifting, larceny under 250 dollars, and drug possession with intent to distribute. Kim Foxx (Cook County, Illinois) enacted a policy to only prosecute felony shoplifting for thefts greater than 1,000 dollars.

Matt Daniels, writing for the Marshall Project, wanted to understand the real impact of a progressive prosecutor on Cook County's Justice System. Kim Foxx's office's unprecedented release of 6 years of felony case-level data provided the opportunity to investigate the effect of Foxx's efforts. He ran a simple interrupted time series analysis and found, "...Kim Foxx turned away [many more cases] that would have been pursued by previous State's Attorney Anita Alvarez."[4]

Prosecutor data is often referred to as the black box of the criminal justice system.[5] Little is known about prosecutor decision-making. Even among progressive prosecutors, Kim Foxx is the only office to release felony case-level data. Despite her commitment to transparency, her office's case management system did not capture misdemeanor data.

It took a Chicago nonprofit civic tech partnership called the Circuit 3 years to provide complete data that included misdemeanor retail theft charges.[2]

Given the recent availability of misdemeanor data, this study aims to provide a more precise estimate of the effect of progressive prosecutorial policies under Kim Foxx in Cook County, Illinois. The previous estimate of Foxx's retail theft policy did not account for the full impact on all retail theft cases as only felony data was available. Additionally, the original simple interrupted time series model provided only a point estimate of the forecasted counterfactual, rather than an estimate with prediction intervals. As a result, no measure of uncertainty in the impact of the policy was included.

Data

Multiple publicly available datasets were used for this analysis. The primary dataset is charging data from Cook County, Illinois, shedding light on prosecutorial decision-making in an unprecedented act of judicial transparency in the United States. The Cook County Clerk's Office retains these administrative court records internally in its information system as part of its normal course of operations, but the records were not in a structured data format and not accessible to the public. The dataset was published in 2019 after the Cook County prosecutor's office allowed The Circuit, a non-profit focused on government transparency and journalism, to scrape 19 years of charging data from its information system and publish the monthly aggregated data for public analysis and use. The publicly available JSON-formatted data is organized by major offense category, including more than 3 million total records, of which more than 325 thousand are theft cases. The charges are also disaggregated by charge level: felony or misdemeanor. Given that the purpose of this research was to assess the effect of the 2016 policy change on retail theft prosecutions, the data was filtered for retail theft cases in the three years before and one year after the policy was implemented, from 2014 to 2018.

To add controls, three other monthly public datasets were used: unemployment, weather, and total theft incidents. Monthly unemployment rate data for Cook County between 2014 to 2018 were downloaded from the U.S. Bureau of Labor Statistics. The unemployment rate is the total number of unemployed people expressed as a percentage of the civilian labor force, without seasonal adjustments. Weather data was accessed from the National Oceanic and Atmospheric Administration's Climate Data Search. The monthly average temperature and precipitation for the Chicago Botanic Garden weather station were selected because of its completeness over the full study period.

Finally, the third dataset is total theft incidents (not just charges) for the City of Chicago, accessed through the Chicago Open Data Portal in the Crimes dataset. County-wide incident data is not available, but the City of Chicago is the primary municipality in Cook County with 54 percent of the county's population, which makes it an acceptable proxy, especially as a covariate. This dataset is compiled by the Chicago Police Department. The dataset was filtered for thefts and the concerned time period then aggregated into monthly counts and joined with the other datasets to be used as an additional covariate.

Methods

Causal inference methods provide statistical tools to evaluate the likelihood of a policy change being observed and the size of the effect. Interrupted time series designs are often used in the criminal justice system, "as an identification strategy for potential policy change."[8] They are helpful when a new system-wide criminal justice policy like bail reform or a charging policy is implemented. "ITS is one of the strongest quasi-experimental designs."[9]

We model the implementation of Kim Foxx's retail theft policy in two ways using Bayesian structural time-series (BSTS) models. The first is a single interrupted time series without controls. In the second, we employ a set of control time series that are "*unaffected by the intervention*" and whose relationship to the time series "*remains stable throughout the post-period.*" [10] We fit these models on pre-policy data to provide a counterfactual estimate of what would have happened if Kim Foxx had not implemented her retail theft policy.

The use of both univariate and multivariate models is consistent with other researchers' use of Causal Impact in the criminal justice literature.[11] The multivariate models we employ include unemployment, weather, and total theft incidents as covariates. These data are correlated with theft charges over time but are unaffected by Foxx's retail theft policy. We argue that including theft incidents as a covariate does not violate the independence rule because evidence shows that the severity of punishment does not act as a deterrent.[12] Foxx's policy was not a categorical declination of retail thefts, but a reduction in the severity of the punishment from a felony to a misdemeanor.

We next provide a discussion on how Kim Foxx's policy fulfills the modeling assumptions required for an interrupted time series (ITS). For any ITS study, sometimes called an event study, the intervention needs to begin at a specific point in time.[13] In public policy this often takes the form of a sudden change in practice or a law change. A newly-elected State's Attorney declining to prosecute a category of cases as felonies fit the first modeling assumption. We know exactly when this office policy went into effect. We use the same policy implementation date as the previous study: November 2016.[4]

Another key assumption for ITS is that no other intervention took place at the same time or in the follow-up period that could contaminate our understanding of the policy effect in question. Prosecutors are known as the "criminal justice system's most powerful actors" for their ability to unilaterally decide what charges to issue.[14] The policy change in question serves as a "strong prior" that absent a newly-elected State Attorney, we would have continued to see the same level of charges issued. We can be confident the decline in retail thefts charges is not affected by other interventions. Because the policy change occurred in 2016, there is sufficient time before COVID-19 to assess the effect of the policy change without delving into the complexities of accounting for COVID-19 impacts in our model.

Lastly, to build a reliable forecast we need to have repeated observations of the outcome of interest, in this case, the number of retail theft cases charged as misdemeanors and felonies, before and after the intervention. The Circuit provided 19 years of monthly retail theft data. We use the 2 years and 11 months immediately prior to the intervention to train the model on overall, felony, and misdemeanor retail theft cases. And we use 2 years and 1 month or 25 months after the policy to assess the impact.

This is done using a python port of Google's Causal Impact called TFImpact.[3] The package is trained on the selected pre-period and then provides a counterfactual prediction absent Kim Foxx's policy. This counterfactual prediction is compared to the actual observed time series. The CausalImpact model then returns the absolute and relative effect as well as the posterior probability of a causal effect.[10] To assess the model fit in the pre-period in the univariate and multivariate models, we use the error metric mean absolute percentage error (MAPE) commonly used in forecasting tasks. Future work into this issue may add a more complex structural times series model. We avoided adding a more sophisticated model in this pre-period to avoid overfitting issues.

Results

Our univariate and multivariate BSTS models produced similar results across all categories that were all statistically significant with a 95% credible interval. The study period we report results for is 2 years and 1 month or 25 months. We discuss the results below and distinguish univariate and multivariate model results as (uni) or (multi) respectively. See figure 1-4 for charts summarizing our findings.

We tested our pre-period model fit for the univariate and multivariate results using mean absolute percentage error. Felony retail theft MAPE is 10.38% (uni) and 9.19% (multi). Misdemeanor retail theft MAPE is 11.33% (uni) and 10.69% (multi). Overall retail MAPE is 8.4% (uni) and 7.86% (multi). Adding controls slightly improved our MAPE score for

all models. Misdemeanor and overall MAPE improve by a half percent and felony MAPE improve by ~1.1%. See figure 5.

We find that charges for felony retail theft drop precipitously. In the study period, felony retail theft dropped 70.5% (uni) or 69.5% (multi) compared to what would have been pursued under the previous administration. This is an average monthly decline of -178 (uni) or -170 (multi). The cumulative impact of this policy is a reduction of -4,454 (uni) or -4,240 (multi) felony retail thefts over the 25 months studied.

We find a corresponding increase in misdemeanor retail theft. In the study period, misdemeanor retail theft charges increased 24.4% (uni) or 25.8% (multi) compared to what would have been pursued under the previous administration. This is an average monthly increase of 125 (uni) or 131 (multi). The cumulative impact of this policy resulted in an increase of 3,143 (uni) or 3,275 (multi) misdemeanor retail thefts over the 25 months studied.

Overall, we find a slight decrease in felony and misdemeanor retail theft. In the study period, all retail theft charges dropped 7% (uni) or 5.5% (multi) compared to what would have been pursued under the previous administration. This is an average monthly decline of -53 (uni) or -42 (multi). The cumulative impact of this policy is a reduction of -1,333 (uni) or -1,045 (multi) of all retail theft charges over the 25 months studied.

Discussion

Taken together, this suggests that a sizable amount of felony retail thefts was now charged as misdemeanors and not simply dismissed. The overall 7% (uni) or 5.5% (multi) decline in thefts could potentially be attributed to an increase in diversions, prosecutors requiring a higher standard of evidence for charges, or a decrease in officers presenting retail theft arrests to the State Attorney's Office. The 7% (uni) or 5.5% (multi) decline also mirrors the 5.5% decrease in all overall charges that took place after Kim Foxx was elected.[4]

However, a review of the cumulative impact for the overall multivariate model suggests another interpretation. Our overall (multi) model's 95% credible intervals indicate that all retail theft charges could have increased slightly in Foxx's term compared to the counterfactual trend. See Figure 2. This lends support to the idea that Foxx was not engaged in the categorical declination of retail theft cases. Instead, she focused on maintaining similar levels of accountability for retail theft at a reduced level of punitiveness.

Conclusion

The methodology and findings presented here offer lessons for other prosecutors' offices, public stakeholders, policymakers, and advocates. The findings show conclusively that charging policies can have a significant effect on prosecutions and the criminal justice system as a whole. Progressive prosecutors and advocates for criminal justice reform should look to Cook County as an example of how such a policy could impact prosecutions of felony retail theft, potentially allowing prosecutors to focus on other priorities, such as violent crime, or devote more resources towards addressing the underlying drivers of crime such as racial inequality and mental health issues.

Our findings demonstrate the extent to which an individual prosecutor, albeit elected, holds influence over the criminal justice system, for better or worse. Without data from other jurisdictions, we are limited to anecdotal observations of the effects of "tough-on-crime" or "law-and-order" policies. However, the magnitude of this progressive policy indicates that such approaches are likely to have similarly large effects on the criminal justice system in the other direction. Or, in other words, Kim Foxx's progressive policies would be easily reversed if she were to be elected out of office and replaced by a more traditional prosecutor. Therefore, a major takeaway from our research for policymakers and advocates is that durable progressive criminal justice reform should not rely extensively on the discretion of individual prosecutors and that statutory reforms are more likely to be sustained over the long term. Alternatively, if progressive advocates and policymakers are unable to enact statutory reforms, they may deliberately choose to focus on electing public prosecutors given their significant influence.

The methodology we used here can be used in other jurisdictions to assess the effect of similar prosecution policy decisions, such as downgrading drug possession felony charges to misdemeanors. The methodology can be used either internally within prosecutors' offices or externally with public stakeholders and advocates, although the latter is limited by the widespread lack of publicly available prosecutorial data. Without such data, public dialogue and debate over criminal justice reform are entirely ideological and speculative. Whether the policies under consideration are progressive or otherwise, such transparency is essential to evidence-based policy-making and the public discourse.

Charts & Tables

Figure 1

Impact of Kim Foxx's Felony Retail Theft Policy

Estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged under a new retail theft policy compared to a forecasted counterfactual of the previous State's Attorney Alvarez's.

Model	Offense Category	Posterior Prob of Causal Effect	Average Absolute Effect	Cumulative Absolute Effect	Relative Effect (%)
Univariate	Overall	100.0%	−53	−1,333	−7%
Univariate	Felony	100.0%	−178	−4,454	−71%
Univariate	Misdemeanor	100.0%	125	3,134	24%
Multivariate	Overall	95.2%	−42	−1,045	−6%
Multivariate	Felony	100.0%	−170	−4,240	−70%
Multivariate	Misdemeanor	100.0%	131	3,275	26%

Average absolute effect is the average number of month retail theft cases that changed. Cumulative absolute effect includes the full study period of 1 year and 1 month. Overall counts is the sum of both felony and misdemeanor offenses.
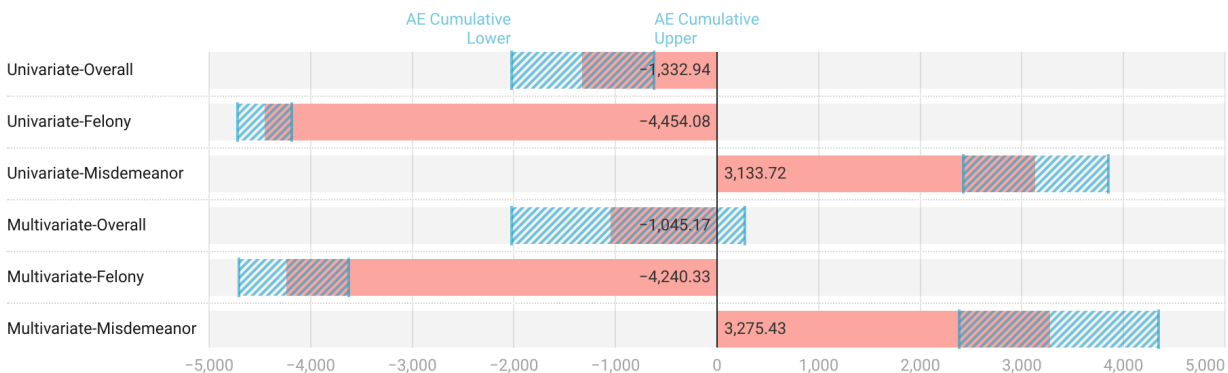
Source: Felony and misdemeanor retail theft data taken from Cook County's The Circuit project. • Created with Datawrapper

Figure 2

Cumulative Impact of Kim Foxx's Felony Retail Theft Policy

Estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged under a new retail theft policy compared to a forecasted counterfactual of the previous State's Attorney Alvarez's.

Average Cumulative Effect; 95% Credible Interval
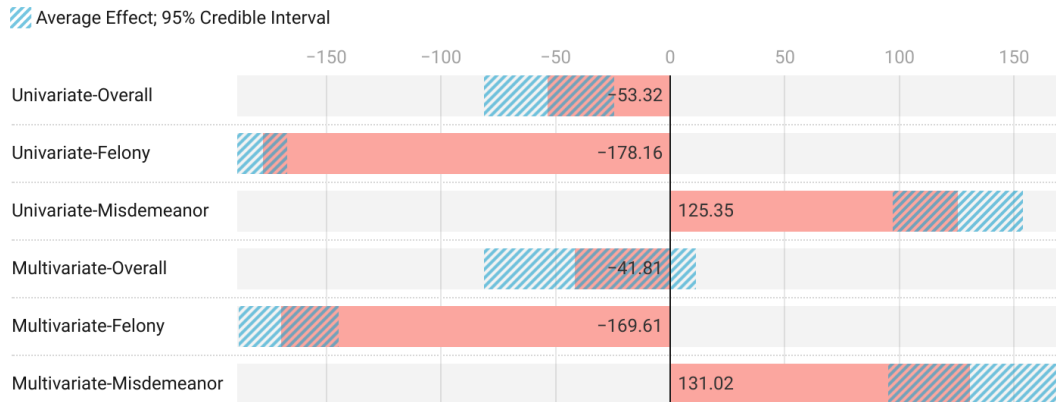

Average absolute effect is the average number of month retail theft cases that changed. Cumulative absolute effect includes the full study period of 2 years and 1 month or 25 months. Overall counts is the sum of both felony and misdemeanor offenses.

Source: Felony and misdemeanor retail theft data taken from Cook County's The Circuit project. • Created with Datawrapper

Figure 3

Average Monthly Impact of Kim Foxx's Felony Retail Theft Policy

Estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged under a new retail theft policy compared to a forecasted counterfactual of the previous State's Attorney Alvarez's.

Average Effect; 95% Credible Interval

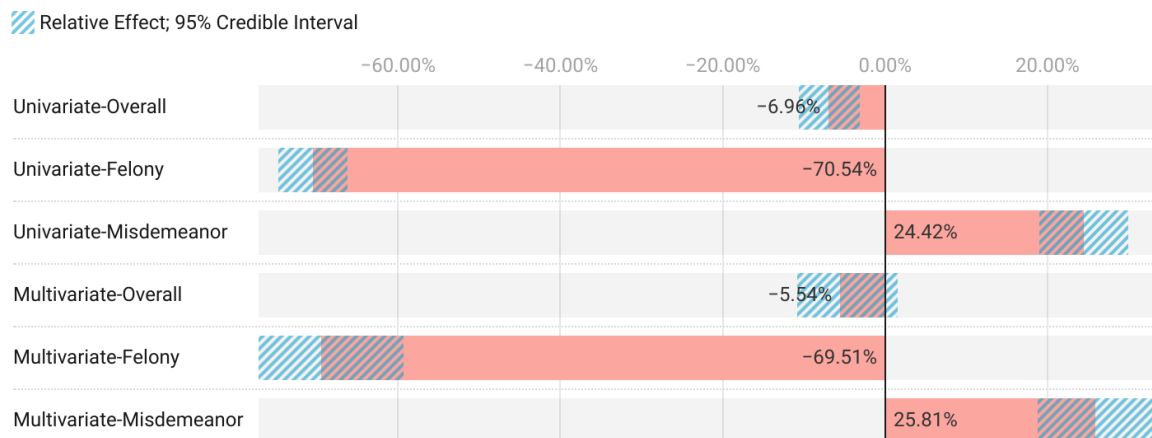|	−150	−100	−50	0	50	100	150
Univariate-Overall				−53.32			
Univariate-Felony		−178.16					
Univariate-Misdemeanor				125.35			
Multivariate-Overall				−41.81			
Multivariate-Felony		−169.61					
Multivariate-Misdemeanor				131.02			

Average absolute effect is the average number of month retail theft cases that changed. Cumulative absolute effect includes the full study period of 2 years and 1 month or 25 months. Overall counts is the sum of both felony and misdemeanor offenses.

Source: Felony and misdemeanor retail theft data taken from Cook County's The Circuit project. • Created with Datawrapper

Figure 4

Relative Impact of Kim Foxx's Felony Retail Theft Policy

Estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged under a new retail theft policy compared to a forecasted counterfactual of the previous State's Attorney Alvarez's.

Relative Effect; 95% Credible Interval

	−60.00%	−40.00%	−20.00%	0.00%	20.00%
Univariate-Overall				−6.96%	
Univariate-Felony				−70.54%	
Univariate-Misdemeanor				24.42%	
Multivariate-Overall				−5.54%	
Multivariate-Felony				−69.51%	
Multivariate-Misdemeanor				25.81%	

Average absolute effect is the average number of month retail theft cases that changed. Cumulative absolute effect includes the full study period of 2 years and 1 month or 25 months. Overall counts is the sum of both felony and misdemeanor offenses.

Source: Felony and misdemeanor retail theft data taken from Cook County's The Circuit project. • Created with Datawrapper

Figure 5

Pre-Period Forecast MAPE

Offense	Univariate MAPE	Multivariate MAPE
All	8.41%	7.86%
Felony	10.38%	9.19%
Misdemeanor	11.33%	10.69%

Created with Datawrapper

Figure 6

Impact of Kim Foxx's Felony Retail Theft Policy - Full Model Results

Estimates on the number of overall, felony, and misdemeanor retail theft cases Foxx's office charged under a new retail theft policy compared to a forecasted counterfactual of the previous State's Attorney Alvarez's.

Model	Offense Category	Posterior Prob of Causal Effect	Average Absolute Effect	Cumulative Absolute Effect	AE Average Lower	AE Average Upper	AE Cumulative Lower	AE Cumulative Upper	Relative Effect	RE Average Lower	RE Average Upper
Univariate	Overall	100	−53	−1,333	−81	−25	−2,032	−622	−7.0%	−10.6%	−3.2%
Univariate	Felony	100	−178	−4,454	−189	−167	−4,721	−4,187	−70.5%	−74.8%	−66.3%
Univariate	Misdemeanor	100	125	3,134	97	154	2,424	3,854	24.4%	18.9%	30.0%
Multivariate	Overall	95	−42	−1,045	−81	11	−2,032	276	−5.5%	−10.8%	1.5%
Multivariate	Felony	100	−170	−4,240	−188	−145	−4,708	−3,624	−69.5%	−77.2%	−59.4%
Multivariate	Misdemeanor	100	131	3,275	95	174	2,384	4,342	25.8%	18.8%	34.2%

Average absolute effect is the average number of month retail theft cases that changed. Cumulative absolute effect includes the full study period of 2 years and 1 month or 25 months. Overall counts is the sum of both felony and misdemeanor offenses.

Source: Felony and misdemeanor retail theft data taken from Cook County's The Circuit project. • Created with Datawrapper

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Appendix

Division of tasks

- Vittorio Costa - modelling and diagnostics (overall retail thefts), data munging, hypothesis tests, powerpoint presentation, writing, and discussion post
- Gabriel Pincus - modelling and diagnostics (felony retail thefts), hypothesis tests, literature review, data munging, data collection, and writing
- Branden DuPont - feature creation, modelling and diagnostics (misdemeanor retail theft), writing, data collection, literature review, and data visualization

Some feedback we initially received was to make the project more geospatial-related. The data on retail theft available was aggregated monthly at the Cook County level. This prevented us from incorporating any geospatial consideration in this analysis.