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De-prosecution and death: A synthetic control analysis of the impact of de-prosecution on homicides

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Abstract

Research Summary: De-prosecution is a policy not to prosecute certain criminal offenses, regardless of whether the crimes were committed. The research question here is whether the application of a de-prosecution policy has an effect on the number of homicides for large cities in the United States. Philadelphia presents a natural experiment to examine this question. During 2010–2014, the Philadelphia District Attorney's Office maintained a consistent and robust number of prosecutions and sentencings. During 2015–2019, the office engaged in a systematic policy of de-prosecution for both felony and misdemeanor cases. The city recorded the fewest number of criminal prosecutions in modern history, with a 70% reduction in the number of criminal sentencings. Philadelphia experienced a concurrent and historically large increase in homicides. This article employs a difference-in-differences analysis using a synthetic control method to estimate the effects of de-prosecution on the number of homicides in Philadelphia. The potential donor pool is composed of the prosecutors' offices for the 100 largest cities in the United States over a 10-year period, with a quantitative categorization of the prosecutors' offices used both as a variable and to exclude cities that may have been subject to a similar de-prosecution treatment. The synthetic control model

estimates that de-prosecution has been associated with a statistically significant increase of 74.79 homicides per year in Philadelphia during 2015–2019.

Policy Implications: As various prosecution policies such as de-prosecution are being implemented across the United States, such policies should be tested for downstream results. The broadscale de-prosecution policy of Philadelphia—particularly for firearm and drug trafficking offenses—appears to have a causal association with a large increase in homicides. The public in Philadelphia will have to make a normative choice between a reduction in the number of prosecutions and an increase in homicides. The government of Philadelphia may consider whether significantly decreased prosecutions by the district attorney's office should result in a decrease in the budget for those services. The overall relationship between de-prosecution and homicides should be reviewed by prosecutors across the nation for consideration in exercising their prosecutorial discretion, given unique local considerations in each jurisdiction.

KEYWORDS
de-prosecution, homicide, prosecution, sentencing, synthetic control

What would happen to the number of homicides in a city if the prosecutor's office stopped charging and convicting defendants of a broad range of crimes? De-prosecution is the discretionary decision not to prosecute certain criminal conduct, regardless of whether the crimes actually were committed. De-prosecution can take place at multiple points in the criminal justice system: pre-offense, charging, pretrial proceedings, or sentencings. The city of Philadelphia presents a natural experiment to answer the question about the impact of de-prosecution. Following a lengthy traditional period of prosecutions, the Philadelphia District Attorney's Office (the "DAO") engaged in a systematic policy of de-prosecution from 2015 to 2019. This policy covered both misdemeanors and felonies, with a particular emphasis on de-prosecuting drug possession, drug trafficking, and felons possessing firearms. In this study, I evaluate whether the policy of de-prosecution has a material impact on homicides in Philadelphia.

This article uses a two-step approach to examine the impact of de-prosecution on homicides. First, I review descriptive statistics for prosecutorial and homicide trends in Philadelphia during 2010–2019. From 2010 to 2014, Philadelphia employed relatively vigorous and consistent prosecutorial policies. From 2015 to 2019, Philadelphia engaged in a methodical de-prosecution strategy encompassing felonies and misdemeanors, corresponding to a substantial increase in the

number of homicides. Then, I use a difference-in-differences ("DiD") analysis and synthetic control method to compare homicide data from 2010 to 2019 across the 100 largest cities in the United States, using Philadelphia as the treatment city. Results from the synthetic control indicate that Philadelphia's de-prosecution strategy was associated with a statistically significant increase of 74.79 homicides per year during the 2015–2019 period. From a statistical, mechanical, and theoretical perspective, the substantial drop in successful prosecutions for felony weapons violations appears to be the strongest driver in this result. These results were confirmed via multiple alternative modeling strategies and robustness tests. I conclude with a discussion of the implications for these findings by considering the trade-offs between de-prosecution and downstream impacts on public safety, budgetary issues for multiple agencies in the criminal justice system, and data-driven prosecutions.

The article makes three distinct contributions to the intersecting scholarship of criminology, law, sociology, and economics. First, it defines the phenomenon of de-prosecution, including a description of the mechanisms of this policy. Second, it is one of the first quantitative tests of the impact of the policy of de-prosecution on homicides. Third, this article is the first study to attempt a quantitative comparative classification of the largest prosecutors' offices in the United States. Such a taxonomy can serve as a starting point for multiple other types of analyses.

1 | POLITICAL, PROCEDURAL, AND RESEARCH BACKGROUND

A short review of Philadelphia politics, criminal procedure, and prior research provides context to this study. The history of the DAO for the past three decades is particularly relevant. From 1991 to 2009, Lynne Abraham was the Philadelphia District Attorney. She was known as the nation's "Deadliest District Attorney" for her zealous pursuit of the death penalty (Rosenberg, 1995). She employed traditional law enforcement and prosecutorial strategies, maintaining prosecutions and sentencings at high levels (Pilkington, 2016).

After a long tenure, Abraham was succeeded by R. Seth Williams. Williams, Philadelphia's first Black District Attorney, was elected in 2009 and began serving in 2010 (Duchneskie, 2017; WHYY Staff Report, 2009). He ran as a moderate reformer, stressing being "smart on crime," with an emphasis on reducing misdemeanor prosecutions. However, he followed a general law-and-order approach with regard to vigorous felony prosecutions (Otterbein, 2017). Under Williams' leadership and balanced approach, homicides in Philadelphia dropped to a historical low of 246 deaths in 2013 and 248 deaths in 2014. He was easily re-elected to a second term beginning in 2014. However, in his second term, he immediately experienced political difficulties. The Philadelphia Democratic party criticized him for prosecuting Democratic elected officials (Flowers, 2015; Thompson, 2014). The Philadelphia police union feuded with him for proposing independent investigations of officer-involved shootings and refusing to allow police officers with credibility problems to testify in criminal cases (Cipriano, 2017; Otterbein, 2015; Philly Law Blog, 2014; Roebuck, 2015). The progressive wing of the local Democratic party attacked him for using traditional prosecution tactics (Gambacorta, 2016; Orso, 2017; Owens, 2015; Rice, 2017).

Following these events, in 2015, Williams began to change his prosecutorial policies in anticipation of running for re-election again. He began to cut more criminal prosecutions and de-criminalize a wider range of conduct. Thus, the de-prosecution policy in Philadelphia began in 2015, a clear policy shift that is captured by the data described in the following sections. Starting in 2015, homicides also began rising in Philadelphia. In 2017, Williams was indicted and convicted by federal authorities for a fraud scheme, and was subsequently sentenced to five years in prison

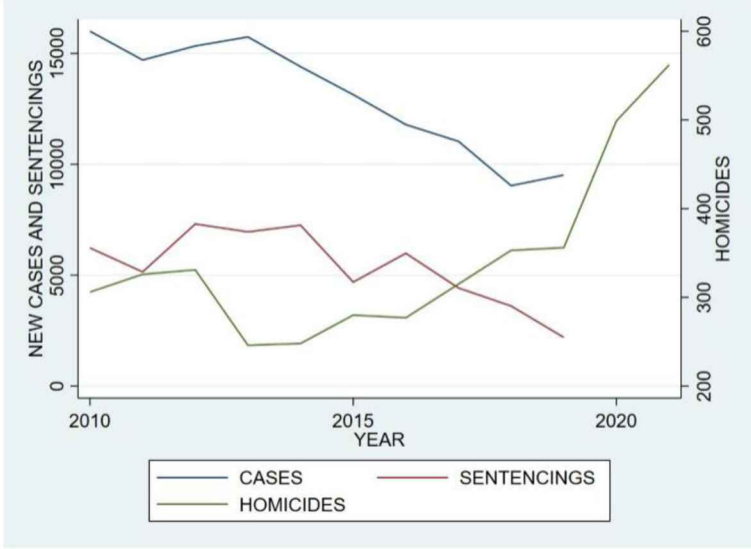

FIGURE 1 Philadelphia new prosecutions, sentencings, and homicides [Color figure can be viewed at wileyonlinelibrary.com]

Source: Pennsylvania Sentencing Commission, Administrative Office of Pennsylvania Courts, and Philadelphia Police Department

(D'Annunzio, 2017; United States v. Rufus Seth Williams, 2017). The District Attorney's Office was run by an interim District Attorney in 2017.

During 2017, Philadelphia elected Larry Krasner as the new District Attorney. Krasner campaigned on a platform of prosecuting less crime, ending mass incarceration, and dismantling systemic racism in the criminal justice system (Krasner Campaign Platform [krasnerforda.com/platform], 2017). Krasner's prior career was as a criminal defense and civil rights lawyer (Otterbein, 2017). Once elected, Krasner immediately instituted policies to reduce the overall number of prosecutions and sentencings in Philadelphia, going well beyond what Williams had attempted. Krasner succeeded in reducing the number of prosecutions and sentencings. However, the trend of fewer prosecutions and more homicides that had started under Williams in 2015 accelerated under Krasner. Figure 1 shows the number of new prosecutions, sentencings, and homicides in Philadelphia during the relevant time period. The trends indicate that the number of cases prosecuted/sentenced and the number of homicides appear to be roughly inverted.

A basic understanding of criminal procedures in Philadelphia is required to understand these trends. There is substantial academic literature on the power of prosecutors (Bellin, 2019; Davis, 2019; Lynch, 1998; Stuntz, 2001). What is less recognized about the power of prosecutors is that their power is only absolute in the decision not to prosecute crimes. When a prosecutor decides to prosecute a crime, he or she still must get the prosecution through the hurdles of a preliminary hearing or indictment, a suppression or other pretrial hearing, a jury or bench trial, and appeals. By comparison, when a prosecutor decides not to move forward with a prosecution, the case simply ends. Thus, de-prosecution is a potent tool, wielded with no external oversight and outside of the normal adversarial process of the U.S. criminal justice system.

Under the procedures used in Philadelphia, there are multiple opportunities for the District Attorney's Office to exercise this negative authority over criminal prosecutions. Initially, the DAO

may simply declare that certain criminal laws will not be prosecuted, a tactic used in Philadelphia (Marin, 2021; Stefano, 2020). There is no limitation on this power of the DAO. A district attorney hypothetically could decide and announce *ex ante* that he or she will not prosecute retail theft, marijuana possession, or even serious felonies.

Beyond categorical de-prosecution decisions, there are further de-prosecution procedural tools in Philadelphia. Every arrest made by the Philadelphia Police Department is reviewed by prosecutors in the DAO's Charging Unit, with guidelines established by the elected District Attorney (Philadelphia DAO Web site [phillyda.org], 2021). As stated by the DAO, "Staffed 24-hours a day, 7-days a week, and 365-days a year, the Assistant District Attorneys in our Charging Unit promptly review every criminal arrest submitted by the Philadelphia Police Department to determine if sufficient evidence exists to properly charge, and with what crimes [sic], an offender." The Charging Unit decides whether the arrest will go forward to prosecution, charges will be reduced, and/or charges will be totally dropped. This is a second step where de-prosecution may occur.

If the arrest and charges are approved by the DAO Charging Unit, then the cases are bifurcated between felonies and misdemeanors. All misdemeanors are assigned to Philadelphia Municipal Court to be decided in bench trials or guilty pleas, unless they are dismissed for some other reason. All felonies initially go to Municipal Court for a preliminary hearing, where the case must be established to a *prima facie* level in a hearing before a judge.[1] The *prima facie* standard is low, the equivalent of probable cause, considering only evidence presented by the prosecution and permitting hearsay evidence (Pennsylvania Code, Pa. R. Crim. P. 542; Commonwealth v. Wojdak, 466 A.2d 991 [Pa. 1983]). If the case is established to a *prima facie* level, it is then "bound over" to the Philadelphia Court of Common Pleas for a jury trial or guilty plea. This felony preliminary hearing stage in Municipal Court is another step in the proceedings where the prosecutors from the Philadelphia DAO may exercise discretion to dismiss a case or work out a plea to a lesser offense. As the Philadelphia DAO web site notes, even after the Charging Unit, "An ADA may later adjust charges to appropriate[ly] fit the evidence" (Philadelphia DAO Web site [phillyda.org], 2021). A judge might also dismiss the case. Thus, the DAO has a third chance to de-prosecute a case.

The Philadelphia DAO gets a fourth procedural option for de-prosecution in the Court of Common Pleas. Even for crimes that are still being prosecuted—after a case has been approved by the DAO Charging Unit and initially established through a preliminary hearing—an assistant district attorney still may dismiss the case while it is at the Philadelphia Court of Common Pleas. This procedure is formally called the *nolle prosequi* of a case. A prosecutor can "nol pros" a case even following a conviction; in Pennsylvania, a judge cannot stop the negative exercise of the prosecutor's discretion (AP News, 2021). A judge might also dismiss a case if the prosecution is not ready or able to proceed. The surviving cases then go to trial or are resolved with a guilty plea. During the guilty plea process, a prosecutor can downgrade charges (e.g., changing a felony drug trafficking charge into a misdemeanor drug possession plea). After all of these various steps, the defendant is sentenced. Sentencing is a measure of how many cases successfully make it from an arrest for criminal conduct through to the imposition of formal sanctions.

The overall procedure acts as a funnel, consistently narrowing the cases actually prosecuted and sentenced. De-prosecution can take place: (1) with a categorical decision not to prosecute certain crimes; (2) at the initial charging stage; (3) at a preliminary hearing; and (4) during any proceeding up to (and even after) sentencing. Whatever felony arrests make it through the DAO's decision-making at the Charging Unit and preliminary hearing stages, those matters show up as new cases in formal Philadelphia Common Pleas case statistics kept by the Administrative Office of Pennsylvania Courts.[2] The Philadelphia arrests that make it all the way through a

conviction and sentencing are reflected in data from the Pennsylvania Sentencing Commission. The number of sentencings reflects the outcome of prosecutorial discretion exercised throughout the criminal justice system. Thus, an analysis of administrative data gives the most accurate view about how the DAO uses its discretion to control what felony cases are prosecuted in Philadelphia.

The literature regarding de-prosecution is a mixture of established historical research on prosecutorial discretion and emerging scholarship on progressive prosecutors. The historical literature on prosecutorial discretion explores the overall power of prosecutors at various stages of criminal justice proceedings (Albonetti, 1987; Green, 2019; Kingsnorth et al., 2006; Spohn, 2018). Some research focuses on the prosecutor's role and impact in affecting the certainty, celerity, and severity of sanctions, with the subsequent impact on crime (Mourtgos & Adams, 2019). In addition, there is research exploring the decision not to prosecute a single category of crimes, such as domestic violence or drug offenses (Cox et al., 2021; Nicosia et al., 2017; Romain & Freiburger, 2013).

With the relatively recent rise in the number of progressive prosecutors (Sklansky, 2017), scholars are beginning to examine the causal impact of some of the policies implemented by these prosecutors. Ouss and Stevenson (2021) have released a working paper calculating that a sharp reduction in cash bail does not have a significant impact on failures-to-appear or pretrial crime. Another working paper (Agan et al., 2021) attempts to quantify the impact of the decision not to prosecute nonviolent misdemeanors in Boston.[3] A more recent brief analysis by the same authors seeks to measure the overall impact of the election of a cohort of progressive prosecutors on crime in their respective jurisdictions (Agan et al., 2022). These current articles agree on the paucity of scholarship in quantitative testing of the policies of progressive prosecutors.

In the area of attempting to categorize prosecutors as progressive or into some other category, the literature is generally theoretical. Academics have written about multiple categories of progressive prosecutors (Levin, 2021). Public interest groups have published guides about what they believe are the most important aspects of progressive prosecution (Fair & Just Prosecution, 2018). Davis (2019) has proposed core factors in identifying progressive prosecutors, taking into account salient prosecutorial functions and political realities. None have attempted a systematic categorization of the existing prosecutors' offices, but all cite to a few offices anecdotally to identify examples of specific progressive prosecutors.

In summary, there is no extant quantitative scholarship addressing: (1) a de-prosecution regime such as Philadelphia; (2) the impact of de-prosecution specifically on homicides; or (3) comparing the impact across the 100 largest cities in the United States, thereby capturing a comparison between different prosecution regimes in large urban environments over a full decade. Simply put, this is an emerging field and sufficient testable data are only now becoming available for analysis.

2 | THE CURRENT STUDY

This study explores whether the de-prosecution regime in Philadelphia is having a causal effect on the number of homicides in the city. The null hypothesis is that the de-prosecution policy produces no change in the number of homicides. The alternative hypothesis is that the policy results in an increase or decrease in the number of homicides, applying a two-tailed test of statistical significance.

2.1 | Data used

The data used for this study include: federally maintained law enforcement statistics, administrative state- and county-level data, standard economic and demographic factors, and public-source data regarding prosecutorial regimes. As discussed above, every arrest by the Philadelphia Police Department is reviewed and approved/disapproved by the District Attorney's Office. Thus, raw arrest data may be misleading. Hypothetically, the Philadelphia Police Department could make 100,000 arrests per year that would show up in national reporting data, but the DAO might only approve 10,000 of those arrests, and might only pursue 500 of those cases through conviction and sentencing. A better measure of how many criminal cases are successfully prosecuted in Philadelphia is contained in administrative court data. Thus, this research uses data from the Administrative Office of Pennsylvania Courts ("AOPC") and the Pennsylvania Sentencing Commission ("Sentencing Commission") to measure how many cases per year are (1) prosecuted and (2) sentenced by the Philadelphia DAO.

The AOPC is the administrative arm of the Pennsylvania judicial system. The AOPC data measure new criminal cases in the Philadelphia Court of Common Pleas (as well as other courts throughout Pennsylvania and other statistics about both criminal and civil cases). The data from the Sentencing Commission encompass all 67 counties in Pennsylvania. The data are extremely granular, detailing every case outcome over the 10-year period by offender, offense, county, sentence, conformity to sentencing guidelines, and multiple other factors. Most relevant to this analysis, the Sentencing Commission data track the total number of sentencings per year in Philadelphia. Both the AOPC and Sentencing Commission data cover the years 2010–2019.

In addition to the Sentencing Commission data, homicide data for the largest 100 cities in the United States have been gathered from the FBI's Uniform Crime Report ("UCR"), specifically using the Supplementary Homicide Report ("SHR"). The SHR provides details about each homicide by police jurisdiction for every year, including victim and offender data, weapons used, and other details (Kaplan, 2021). Once again, the data for 2010–2019 are used.[4] In addition to Part I crimes, this article examines two Part II crimes, drug trafficking and weapons offenses, as potentially explanatory of the trends discussed herein.

Other data sources are used to supplement the above-referenced information. The 100 largest cities were identified through United States Census and voting data. Additional information was accessed through the publicly available data dashboards of the Philadelphia Police Department, the Philadelphia DAO, and the City of Philadelphia. Median household income rates were acquired from information published by the United States Federal Reserve. Specific population numbers for each city were accessed through United States Census and other publicly available population sources.

Finally, information was gathered to categorize each prosecutor's office. This required a manual search for all 100 prosecutors' offices through publicly available data: official agency web sites, campaign sites, funding reports, candidate questionnaires, personal and office social media, publicly available statements to media, and the few existing statistical dashboards.

The years 2020–2021 have been intentionally excluded from the analysis for two reasons. First, the AOPC and Sentencing Commission data for 2020 and 2021 were not yet available as of the writing of this article. Second, the 2020–2021 data may be viewed as aberrational because of the coronavirus pandemic and civil unrest related to the murder of George Floyd in Minnesota. To the extent 2020 or 2021 are referenced, it will only be to highlight specific data points that may be natural extensions of the trends discussed herein.

2.2 | Methodological strategy

To examine the relationship between de-prosecution and homicides in Philadelphia, a difference-in-differences ("DiD") method is used. The standard approach to computing DiD estimates of the effect of a city-level policy shock is to regress a city- and time-varying outcome (Y_{it}) on a time-varying treatment variable (D_{it}), a vector of time-varying covariates (X_{it}), and city and year fixed effects, in addition to an error factor, all described by the following equation:

$$Y_{it} = \alpha + \beta D_{it} + Xit\delta + \psi_c + \varphi_t + \varepsilon_{it}.$$

This equation yields an estimate of the treatment effect of the policy change. The critical assumption is that the treated city and the comparison location must have experienced parallel trends during the pre-treatment period. The DiD method requires a valid counterfactual to Philadelphia to measure the impact of the shock of de-prosecution. However, there is no perfect counterfactual match for Philadelphia for purposes of a classic DiD analysis. Thus, I use a synthetic control algorithm. The synthetic control method (Abadie & Gardeazabal, 2003; Abadie et al., 2010; Abadie et al., 2015; Abadie, 2021) has been utilized successfully to merge quantitative and qualitative analyses across multiple disciplines (Acemoglu et al., 2016; Bohn et al., 2014; Chalfin & Deza, 2020; Donohue et al., 2017; Grier & Maynard, 2016; Kleven et al., 2013; Pinotti, 2015; Robbins et al., 2017; Saunders et al., 2015; Williams, 2017).

In this study, I use an algorithm developed for use with the synthetic control method to match a combination of cities from the donor pool to create a synthetic counterfactual Philadelphia. The potential donor pool is the other 99 largest cities in the United States, excluding the progressive prosecutors' offices. Synthetic Philadelphia is created from the donor pool and then compared to the real Philadelphia. The method attempts to match synthetic Philadelphia and real Philadelphia during the 2010–2014 pre-period, when there were normal volumes of prosecutions and sentencings. The synthetic control method then compares the results for synthetic Philadelphia to real Philadelphia during the 2015–2019 post-period, when de-prosecution was taking place in real Philadelphia but not for synthetic Philadelphia. The comparison between the pre-period and post-period allows a DiD analysis. Synthetic Philadelphia hypothesizes the impact on homicides if de-prosecution had not occurred in Philadelphia from 2015 to 2019 (Bartos & Kubrin, 2018).

The synthetic control model was estimated using R, applying the *Synth* package created by Abadie and colleagues (2010). The underlying data cover the 100 largest cities in the United States. The model has a time predictor pre-period range of 2010–2014 and a post-period range of 2015–2019. The number of homicides per year is the dependent variable. The challenge with this synthetic control model is to use variables that both produce parallel trends in the pre-period and are sufficiently robust to power the post-period results. The model that ultimately delivered the best fit for the data has population, cleared homicide cases, and homicide clearance rates as regular predictors. Median household income is passed in as the first special predictor. The categorization of the prosecutors and the number of homicides are used as additional special predictors. For homicides, the raw values are passed into the model. Abadie (2021) notes that the underlying permutation distribution is designed to work with raw data; using log values, rates, or other scaling techniques may invalidate results.

There are multiple optimizing methods available for the *Synth* package. For the base synthetic control model where Philadelphia is the treated city, the *BFGS* optimizer produced strong parallel trends between synthetic Philadelphia and real Philadelphia during the pre-period. In the placebo control, all of the remaining cities chosen for study are looped through the same data object and *Synth* functions iteratively with "All" selected for the optimizer to try every possible combination

of city and optimizer method. These results are assembled into a dataframe object in R to identify donors, calculate the *p*-value, and generate plots.

In the robustness section of this article, the methodology and results are tested in multiple ways. An alternative synthetic control package is employed to compare results. Different modeling strategies, time constraints, and variables also are tested.

2.3 | The categorization of chief prosecutors

One of the unique contributions of this article is the independent categorization of the chief prosecutor in each of the 100 largest cities in the United States from 2010 to 2019. For each year, the chief prosecutors' policies for the top 100 cities were analyzed and placed into one of three possible categories: (1) "traditional"; (2) "middle"; or (3) "progressive". This categorization is done for two purposes. First, the classification adds a predictor when comparing prosecution regimes between cities and within cities over time. Second, in order to reach a valid DiD result using the synthetic control method, it is necessary to exclude other cities that may have potentially received the same de-prosecution treatment as Philadelphia from 2015 to 2019 (the post-period), otherwise the synthetic control model may be contaminated (Bartos & Kubrin, 2018). The "progressive" category acts as a proxy for the de-prosecution strategy. For Philadelphia, granular official data were available to ascertain how many cases actually were prosecuted/sentenced, demonstrating the fact of the de-prosecution policy. For the majority of cities, such data were not available, necessitating the use of a proxy measure in order to assure the integrity of the donor pool.

Prior literature concedes that defining a "progressive prosecutor" is difficult and requires using proxy measures (Sklansky, 2017). One research study simply relied on an outside nonprofit's categorization of progressive prosecutors before attempting to measure the prosecutors' impact, with no internal validation (Agan, Doleac & Harvey, 2022). That nonprofit has established "21 Principles for the 21st Century Prosecutor," which range from general procedural fairness suggestions—such as not hiding evidence—to very specific qualities for progressive prosecutors: banning the death penalty, engaging in implicit bias training, curtailing mass incarceration, and ending cash bail (Fair & Just Prosecution, 2018). Another scholar has created cohorts within the categorization of progressive prosecutors, with the most extreme category consisting of the "anti-carceral prosecutor," for whom "doing justice . . . entails not prosecuting at all" (i.e., de-prosecution), but does not then assign actual prosecutors to these categories (Levin, 2021).

In creating a list of factors in order to classify prosecutors as progressive, Davis (2019)—a noted progressive legal scholar—identifies the following criteria: opposition to mass incarceration, highlighting racial disparities in criminal justice outcomes, bail reform, not charging certain offenses, never seeking the death penalty, refusal to use mandatory minimum sentences, treating drugs as a medical issue rather than a criminal issue, and enforced implicit bias training. Davis (2019) also includes a discussion of how the underlying political framework between majority Democratic and majority Republican areas affects the electoral viability of progressive prosecutors, as well as the fact that elected prosecutors who were solely criminal defense lawyers or civil rights lawyers are more open to and apt to become progressive prosecutors when compared to long-time line prosecutors.

Reviewing the extant literature, I chose the most salient factors agreed upon by these various scholars and outside parties to assess whether a prosecutor was progressive or traditional. I excluded some factors that either should apply to all prosecutors (e.g., turn over all exculpatory evidence) or that have been adopted by a substantial number of prosecutors regardless of

prosecutorial orientation (e.g., the use of data in evaluating outcomes or the creation of a conviction integrity unit). In order to qualify as a progressive prosecutor, I considered 15 factors: self-identification as a progressive; stated intention to prosecute fewer cases or confirmatory data; categorical ban on death penalty; favors decriminalizing drug possession; cites to systemic racism or criminal justice system as racist; cites to mass incarceration as significant problem; stated preference to end cash bail; conducting implicit bias training or implicit bias as campaign point; no experience as line state court prosecutor; defense/civil rights experience only; supports ending use of mandatory minimum sentences; support for sanctuary cities; campaign funded by a George Soros PAC; less than eit years in office; and jurisdiction is in a heavily Democratic area. To be classified as a progressive prosecutor, the chief prosecutor had to qualify in at least 10 of these 15 categories.

The factors for a traditional prosecutor are in many ways the photographic negative of the progressive prosecutor factors. In order to qualify as a traditional prosecutor, I considered 13 factors: self-identified as traditional or "law-and-order"; no ban on death penalty; active drug prosecutions highlighted; links drugs to violent crime; line state-court prosecutorial experience of at least five years; lack of criminal defense experience; not opposed to use of cash bail; support for mandatory minimum sentences; opposition to sanctuary cities; endorsed by police unions; formally opposed by or protested by progressive entities; more than 10 years in office; and jurisdiction is in a heavily Republican area. To be classified as a traditional prosecutor, the chief prosecutor had to qualify in at least nine of these 13 categories. The middle category of prosecutors consisted of prosecutors who did not fit into either of the other two categories.

The significant factors used to rate the prosecutors' offices across this spectrum require an understanding of both prosecution and politics. Some factors clearly denote a progressive prosecution regime, such as an explicit promise to charge and convict fewer people, citations to mass incarceration and systemic racism in the criminal justice system, and a pledge to end the use of cash bail. Some factors signal a traditional prosecution regime, including a "law-and-order" campaign platform, aggressive use of drug prosecutions as being linked to violent crime, and endorsements by police unions. Other factors are more subtle. It is easier to be a progressive prosecutor in a heavily Democratic city and easier to be a traditional prosecutor in a heavily Republican jurisdiction. Extended service as a local line prosecutor is a signal for a more traditional view, whether through repetitive exposure to criminal cases or regulatory capture. Experience solely as a defense attorney or civil rights attorney is a signal for a more progressive view, with a less confined version of the "correct" procedures. This attempt to establish objective criteria for the classification of prosecutors' offices is an initial step toward permitting a quantitative analysis of such offices.

Applying these factors, the classification of the prosecutors' offices for the treatment period of 2015–2019 is in Table 1 (listed in order of population of city).

The identification of the progressive prosecutors' offices using this independent identification technique did not differ substantially from the identification of progressive prosecutors made by the nonprofit agency cited above (Agan, Doleac & Harvey, 2022). Moreover, the scholars who have addressed theoretical factors for progressive prosecutors have used many of these same cities as exemplars of progressive prosecution regimes.[5] Thus, while this article's categorization technique is quantitatively novel and at a greater scale than prior taxonomies, it appears to confirm other identifications of progressive prosecutors.

TABLE 1 Categorization of prosecutors' offices: 100 largest cities in the United States (2015–2019)

Progressive	Middle	Traditional
Chicago, Philadelphia, San Francisco, Seattle, Denver, Boston, Baltimore, Milwaukee, Albuquerque, Tampa, St. Louis, Corpus Christi, Orlando, Norfolk, Durham, Madison, and Birmingham.	New York, Los Angeles, Houston, San Antonio, San Diego, Dallas, San Jose, Honolulu, Austin, Indianapolis, Jacksonville, Nashville, Louisville, Portland, Las Vegas, Tucson, Long Beach, Kansas City, Atlanta, Omaha, Raleigh, Minneapolis, Cleveland, Arlington, Bakersfield, Pittsburgh, Anchorage, Stockton, St. Paul, Newark, Henderson, Buffalo, Jersey City, Chula Vista, Garland, Irving, North Las Vegas, San Bernadino, and Richmond.	Phoenix, Columbus, Charlotte, Fort Worth, Detroit, El Paso, Memphis, Oklahoma City, Fresno, Sacramento, Mesa, Virginia Beach, Colorado Springs, Miami, Oakland, Tulsa, Wichita, New Orleans, Aurora, Anaheim, Santa Ana, Riverside, Lexington, Cincinnati, Toledo, Greensboro, Plano, Lincoln, Fort Wayne, St. Petersburg, Chandler, Laredo, Lubbock, Irvine, Winston-Salem, Glendale, Hialeah, Reno, Chesapeake, Gilbert, Baton Rouge, Scottsdale, Fremont, and Boise.

3 | RESULTS

3.1 | Descriptive data

Table 2 shows criminal justice trends in Philadelphia from 2010 to 2019 compiled from the AOPC, Sentencing Commission, official homicide totals, and standard population and income information. The three most obvious trends are the number of new prosecutions, the number of sentencings, and the number of homicides. Prosecutions started at a robust 16,000 cases in 2010, showed minor variations through 2014, then declined to 9514 cases by 2019.[6] The number of total sentencings started at 6230 in 2010, peaked at 7252 in 2014, and dropped to 2195 by 2019. The number of sentencings dropped even though violent crime was rising in Philadelphia. The shock of de-prosecution began when Seth Williams pivoted toward de-prosecution in 2015, showing a marked and persistent decline in both new cases prosecuted and sentencings. These decreasing trends in new prosecutions and sentencings accelerated when Larry Krasner was elected in 2017 and took office in 2018.[7] By 2019, the Philadelphia DAO was handling 70% fewer sentencings than in 2014.

The marked decline in new prosecutions reported—which are new cases that have been approved by the DAO's Charging Unit and survived a probable cause hearing before a judge—suggests that the policy of de-prosecution is creating a barrier to entry. The steady decline in sentencings indicates de-prosecution's cumulative effect across the criminal justice system. The scope and scale of the change in Philadelphia across a single decade is dramatic. The year 2015 appears to be the clearest de-prosecution break point. During 2015, sentencings declined by more than 35%, a much larger decline than during any prior year. Prosecutions dropped below 14,000 per year in 2015 and kept declining. I will base the intervention on the 2015 break point, but will test 2017 and 2018 as alternative treatment dates when addressing robustness of the modeling.

TABLE 2 Historical statistics for Philadelphia

Year	New prosecutions	Sentencings	Drug felonies	Drug misdemeanors	VUFA felonies	Population	Median income	Homicides
2010	16,000	6230	2498	508	719	1,528,283	34,667	306
2011	14,702	5147	2427	341	473	1,540,466	34,433	326
2012	15,334	7308	2714	448	791	1,551,824	35,518	331
2013	15,743	6953	2621	381	854	1,558,313	36,918	246
2014	14,401	7252	2946	493	937	1,565,460	39,037	248
2015	13,140	4688	1939	436	949	1,571,065	41,210	280
2016	11,789	5986	2269	762	963	1,576,051	41,514	277
2017	11,034	4423	1395	611	878	1,580,601	40,193	315
2018	9036	3609	1042	483	683	1,583,592	46,149	353
2019	9514	2195	800	280	440	1,584,064	47,598	356
Trend per year (2014–2019)	(814.5)	(1011.4)	(429.2)	(42.6)	(99.4)	3720.8	1712.1	21.6

The number of homicides follows a roughly inverse pattern to the number of new cases and sentencings. Homicides in Philadelphia started at 306 deaths in 2010, dropped to a low of 246 in 2013 and 248 in 2014, then increased to 356 homicides by 2019. Demonstrating the continuing nature of this trend, Philadelphia had 499 homicides in 2020 and 562 homicides in 2021 (Philadelphia Police Department Dashboard [phillypolice.com/crime-maps-stats], 2022). In a six-year span, Philadelphia more than doubled the number of homicides in an already violent city. Putting these trends into a broader historical perspective is useful. Philadelphia never previously recorded more than 500 homicides in a single year, even during the crack cocaine epidemic of the early 1990s. Philadelphia's 562 homicides in 2021 set a new all-time record for the city. On the number of prosecutions and sentencings, the Pennsylvania Sentencing Commission has data publicly available as far back as 1984, while AOPC data are available through 1993. During the last 35+ years, Philadelphia never prosecuted and sentenced so few cases as in 2019. Thus, Philadelphia is at a historically low level of prosecutions/sentencings and historically high level of homicides.

Meanwhile, the other major demographic trends for Philadelphia from 2010 to 2019 were stable. The population and median household income for Philadelphia changed only modestly. There is a steady but small increase in population. Similarly, there is a steady and incremental increase in median household income. The city has been firmly controlled by the Democratic party throughout this time period. The size of the police department has not changed.[8] There have been no major historical events in Philadelphia.

Finally, there are some clear trends in the Part II crimes listed in Table 2. The Philadelphia DAO publicly committed to reducing the number of prosecutions and amount of incarceration for drug possession and other nonviolent offenses, pursuant to District Attorney Krasner's campaign (Krasner Campaign Platform [krasnerforda.com/platform], 2017). The DAO reduced sentencings for drug possession, which are classified as Drug Misdemeanors in Table 2 and under Pennsylvania law (The Controlled Substance, Drug, Device and Cosmetic Act, 35 P.S. § 780-113(a)(16)).[9] However, as shown in Table 2, the DAO also greatly reduced sentencings for drug felonies and gun

TABLE 3 Sentencing trends for Philadelphia

Year	State prison sentences	State prison drug sentences	Conformity to guidelines	Mitigated or below sentences
2010	27%	21%	51%	35%
2011	29%	24%	44%	43%
2012	26%	22%	44%	45%
2013	30%	23%	46%	43%
2014	23%	12%	45%	47%
2015	29%	13%	39%	51%
2016	23%	9%	43%	48%
2017	26%	10%	45%	46%
2018	24%	5%	43%	46%
2019	24%	6%	42%	46%

Source: Pennsylvania Sentencing Commission.

possession felonies. Felony drug offenses in Pennsylvania are drug trafficking offenses, where the defendant is convicted of actually dealing drugs or, in the alternative, possessing a quantity of drugs plus other evidence that demonstrates that the defendant was engaged in drug trafficking (The Controlled Substance, Drug, Device and Cosmetic Act, 35 P.S. § 780-113(a)(30)). Drug felony sentencings dropped 72% from 2014 to 2019. Violations of the Uniform Firearms Act ("VUFA") felonies in Pennsylvania generally are felons who are prohibited from carrying firearms or people who are "straw purchasing" firearms (i.e., buying firearms for others who are not permitted to buy for themselves, usually because of prior convictions) (Pennsylvania Consolidated Statutes, 18 P.S. § 6105). VUFA felony sentencings dropped 53% from 2014 to 2019. De-prosecution in the Philadelphia DAO has gone beyond misdemeanors and now covers some distinct felony categories of crimes.

While the number of new cases and sentencings have been dropping precipitously, the overall trends for length of sentences have not changed by a large degree. Philadelphia traditionally has sentenced a relatively high number of cases outside of the standard range of the Pennsylvania sentencing guidelines, with most of those variations coming in sentences that are mitigated or below mitigated range sentences. As Table 3 demonstrates, Philadelphia's tendency to sentence below the standard range of the sentencing guidelines has not varied tremendously across the 2010–2019 time period, with the exception of sending significantly fewer drug trafficking defendants to state prison.

The correlation between new prosecutions in Philadelphia and homicides is –0.54, between overall sentencings and homicides is –0.68, and between VUFA felony sentencings and homicides is a robust –0.74. In other words, fewer cases prosecuted and sentenced—particularly gun cases—is associated with greater numbers of homicides. Adding the overall number of sentencings and drug felony sentencings as rudimentary controls, the association between VUFA felony sentencings and homicides is statistically significant at the $p < 0.05$ level (p-value = 0.034). The R-squared value is 0.762, showing the correlational power of these statistics, and the standard errors are negligible, increasing confidence that there is some relationship between de-prosecution and increased homicides. The key issue then becomes to compare Philadelphia to a valid counterfactual to quantify the impact of de-prosecution on homicides.

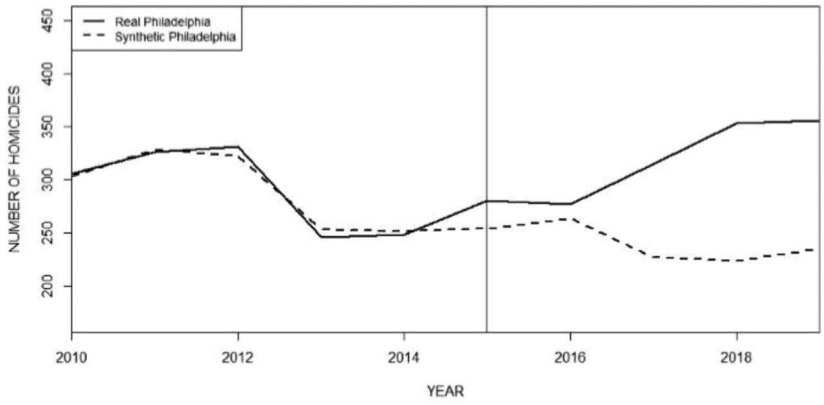

FIGURE 2 Synthetic control plot of Philadelphia homicides compared to nonprogressive cities. The solid horizontal line shows homicides by year in real Philadelphia. The dashed line shows homicides by year in a counterfactual synthetic Philadelphia. The vertical line at 2015 divides the pre-period and the post-period

3.2 | Synthetic control method

To assess the relationship between de-prosecution and homicides in Philadelphia, it is useful to compare the homicides in Philadelphia to a counterfactual, then apply a DiD analysis. However, there is no city exactly like Philadelphia. Accordingly, I use a synthetic control method to test against Philadelphia. The synthetic control method uses a combination of DiD and matching strategies. The dependent variable is the number of homicides. Homicides were chosen specifically because of (1) the relative accuracy of national data, particularly when compared to other crimes, and (2) the role of homicide totals in affecting public views of safety and violence.

Applying the synthetic control model with the methodology previously described, the results are shown in Figure 2. Figure 2 demonstrates a strong pre-period match between synthetic Philadelphia (control) and real Philadelphia (treatment), establishing the requisite parallel trends. The normalized root mean square error for that preperiod comparison is 0.05387. At the point when Seth Williams began to employ a de-prosecution strategy in 2015, synthetic Philadelphia and real Philadelphia begin to diverge.[10] Like any prosecutorial strategy, it takes a period of time for the full impact of the strategy to be felt, so there is a lag period.[11]

As described in the data in Table 2, District Attorney Krasner reduced Common Pleas prosecutions and sentencings drastically in 2018–2019. The synthetic control model shows a stronger divergence between synthetic Philadelphia and real Philadelphia at that point, as demonstrated in Figure 2. By the end of 2019, real Philadelphia was experiencing an additional 100+ homicides per year over what is predicted for synthetic Philadelphia.

The donor cities (with relative contributions) selected by the synthetic control algorithm to create synthetic Philadelphia are Detroit (0.468), New Orleans (0.334), and New York (0.198). These cities make intuitive sense, as they are a collection of post-industrial cities, socioeconomically and ethnically diverse, and have histories of areas of violence. The parsimonious nature of the selection of donor cities is a predicted factor of the synthetic control algorithm according to its creator (Abadie, 2021), and is evidence that the method is working correctly.[12]

In order to gain a broader perspective on the status of Philadelphia's homicides and the de-prosecution strategy, it is useful here to run a test to capture the other cities included in the

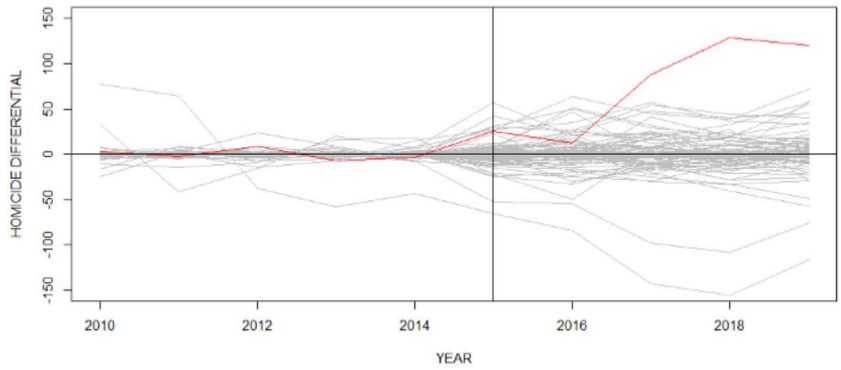

FIGURE 3 Placebo plot: Philadelphia homicides compared to nonprogressive cities. The graph shows Philadelphia in a red line and the nonprogressive cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide differential for each year calculated from the expected mean number of homicides. The vertical line at 2015 divides the pre-period and the post-period [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 4 Difference-in-differences estimate for de-prosecution and homicides in Philadelphia

Pre-treatment period 2010–2014 Mean difference	Post-treatment period 2015–2019 Mean difference	Difference-in-differences Estimate	Implied *p*-value
−0.165	74.627	74.792	0.012048

potential donor pool of nonprogressive cities. This "placebo plot" is illustrated in Figure 3. Once again, the synthetic control method reveals a notable difference between Philadelphia and the nonprogressive donor pool. During the pre-period, when prosecutions were at normal historical levels, Philadelphia maintained a position in the middle of the cohort of large cities with respect to the homicide differential (the difference between the expected number of homicides and the actual number of homicides per year). However, when de-prosecution began and then accelerated during the post-period of 2015–2019, Philadelphia's homicide differential first rose and then significantly exceeded the cities with nonprogressive prosecutors' offices. When compared to Philadelphia, the traditional and middle categories of prosecutors reflected either (a) a much lower homicide differential or (b) a negative homicide differential. As de-prosecution was fully implemented, Philadelphia's positive homicide differential rose above all of the large cities that did not implement a de-prosecution strategy.

Table 4 shows the results from the DiD analysis. The DiD estimator shows a statistically significant increase of 74.79 homicides per year in Philadelphia during the de-prosecution period ($p = 0.012$). We can reject the null hypothesis that Philadelphia is no different than the nonprogressive cities in the 2015–2019 period. Using less formal language, de-prosecution in Philadelphia is associated with 74.79 more homicides per year than expected when compared to other large U.S. cities. The effect of the de-prosecution strategy is increasing the longer it is in place, with an additional 100+ homicides by 2019. During the five-year post-period, there were an additional 373 homicides in Philadelphia beyond what would be predicted if the de-prosecution policy never had been implemented.

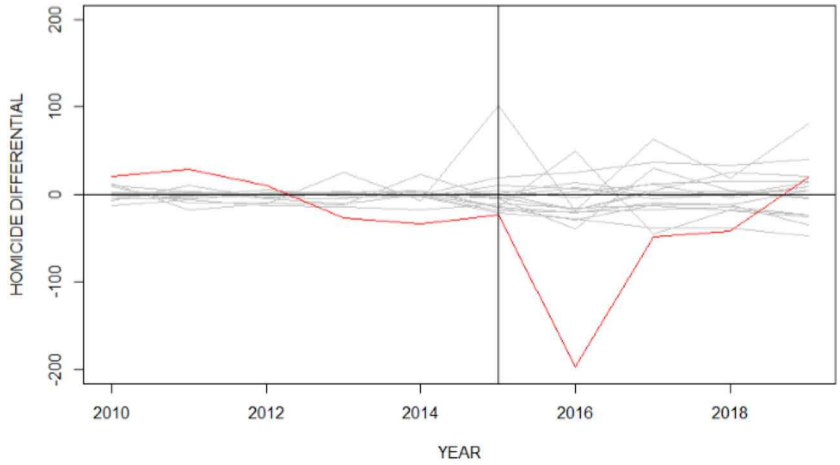

FIGURE 4 Placebo plot: Philadelphia homicides compared to other progressive cities. The graph shows Philadelphia in a red line. The other progressive cities from the donor pool are shown in gray lines. The *x*-axis is the year and the *y*-axis denotes the homicide differential per year. The vertical line at 2015 indicates the beginning of the treatment period [Color figure can be viewed at wileyonlinelibrary.com]

Another way to examine this issue is to ask whether Philadelphia is different from other progressive/de-prosecuting cities in this homicide trend. As a test of this question, I use the synthetic control model placebo plot, but compare Philadelphia to the other identified progressive cities (e.g., Chicago, St. Louis, etc.). Figure 4 presents the results. Figure 4 graphically demonstrates that Philadelphia is not different from the other progressive, de-prosecuting cities. In fact, even when Seth Williams was beginning to institute de-prosecution on a smaller scale, Philadelphia was doing better than predicted with homicides. But under a prolonged application of the de-prosecution strategy, Philadelphia displays homicide trends that are comparable to other major cities with progressive prosecutors from a statistical standpoint.[13] In nonstatistical language, Philadelphia is performing similarly to the other progressive cities regarding the expected number of homicides.

In summary, the overall results are consistent. The de-prosecution strategy is associated with an increase in homicides in Philadelphia. The association is graphically and statistically confirmed when comparing synthetic Philadelphia to real Philadelphia using the synthetic control method. This result persists when Philadelphia's de-prosecution strategy is compared to the cohort of non-progressive prosecutors' offices. By comparison, Philadelphia's homicide differential is essentially indistinguishable from other progressive prosecutors' offices that are employing a de-prosecution strategy. This analysis suggests that de-prosecuting crimes results in a substantial increase in the number of homicides, to a statistically significant level.

4 | ROBUSTNESS AND VALIDITY CHECKS

There are multiple ways to check robustness and design validity for this study, including using a different algorithm, changing the treatment period and unit of measurement, using a model that does not rely on the categorization of the prosecutors, adding variables, altering the donor pool,

using different de-prosecuting cities to test the hypothesis, and anecdotally testing the proxy of progressive cities for de-prosecution. Each of these checks is discussed below.

4.1 | Alternative algorithm

One robustness check is to use a different algorithm with the synthetic control model. In the main portion of this article, I used the traditional *Synth* package created in R by Abadie and colleagues (Abadie & Gardeazabal, 2003; Abadie et al., 2010). That package has been reviewed and modified in an R package called *MSCMT* introduced by Becker and Klößner (2016). The *MSCMT* package includes three principal changes within the synthetic control method: (1) allowing for the use of multiple outcome variables; (2) permitting a time series to be supplied as economic predictors; and (3) improved cross-validation within placebo controls (Becker & Klößner, 2018). In addition, while the algorithmic foundations are similar, *MSCMT* incorporates more transparent statistical functions and alternative graphing capabilities. While the formatting of data structures for synthetic control data in *MSCMT* is slightly different than that in *Synth*, the same data parameters may be passed into the algorithm.

Using the *MSCMT* package on exactly the same data, the results were virtually unchanged. The *MSCMT* package produced a pre-period and post-period comparison that appears identical to the *Synth* package comparison. The *MSCMT* package selected Detroit, New York, and New Orleans as donor cities, the same donor cities as chosen in *Synth*. The DiD estimate remains at 74.79 homicides (with a fractional difference when extending the figures). The *p*-value using *MSCMT* was 0.0102, slightly different and lower from the *Synth* *p*-value of 0.0120.

4.2 | Changing treatment period and unit of measurement

The robustness of the results can be tested by using a different treatment period and a different unit of measurement. First, it is possible to characterize Seth Williams as merely experimenting with de-prosecution, and thus the post-period arguably should begin only after Larry Krasner was elected in 2017 or took office in 2018. Second, the homicide differential can be expressed as the homicide rate rather than the native unit of measurement, which is the raw number of homicides. For the sake of comprehensiveness, both approaches were explored.

First, I use the synthetic control method to test a post-period defined by when Larry Krasner was elected District Attorney of Philadelphia in 2017. The year 2017 is a valid alternative treatment point because the data show a large initial de-prosecution break for prosecutions and sentencings in 2015, a brief upward tick in sentencings (but not prosecutions) in 2016, and then persistent declines in prosecutions and sentencings in the 2017–2019 time period. The use of Krasner's election in 2017 as an alternative date for the beginning of the treatment period is accepted in theory by Abadie (2021) to account for anticipatory effects. In a one-party city like Philadelphia, Krasner's victory in the primary in the spring of 2017 assured his eventual election. Krasner already had announced his de-prosecution plans during the campaign. Thus, anticipatory effects may have been exhibited by the police, prosecutors, defense lawyers, judges, and potentially even offenders. The synthetic control model predicated on de-prosecution beginning in 2017, again pitting Philadelphia against the nonprogressive donor cities, is shown in Figure 5.

Figure 5 demonstrates graphically that homicides dramatically increased following Krasner's election when comparing synthetic Philadelphia to real Philadelphia. The underlying statistical

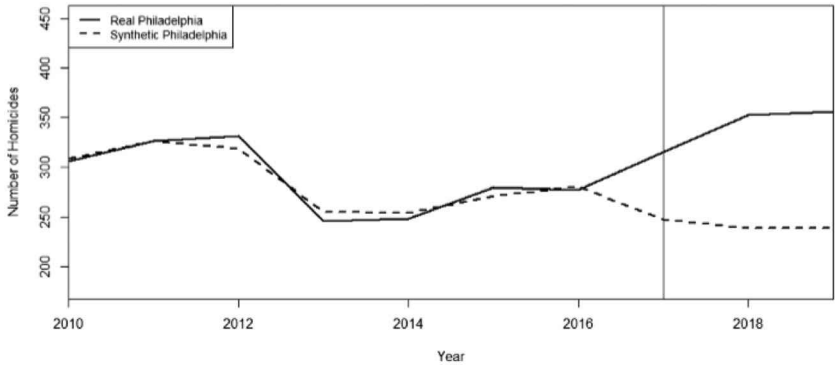

FIGURE 5 Using Krasner election in 2017 to define post-period—Synthetic control plot: Philadelphia versus nonprogressive cities. The solid horizontal line shows homicides by year in real Philadelphia. The dashed line shows homicides by year in a counterfactual synthetic Philadelphia. The vertical line at 2017 divides the pre-period and the post-period, defined here by the election of District Attorney Larry Krasner

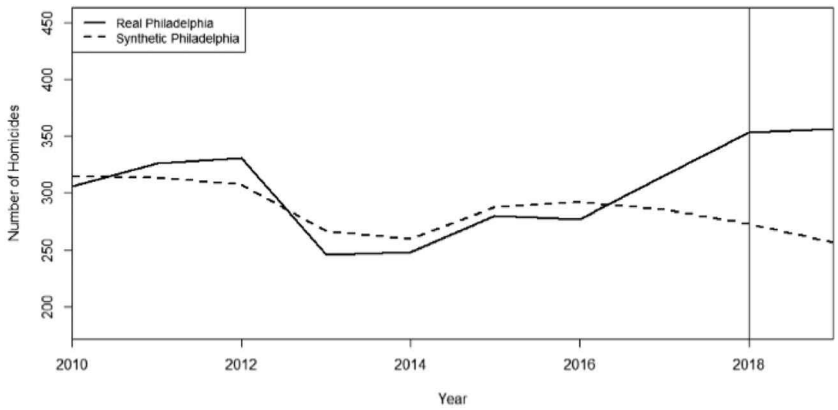

FIGURE 6 Using Krasner election in 2018 to define post-period—Synthetic control plot: Philadelphia versus nonprogressive cities. The solid horizontal line shows homicides by year in real Philadelphia. The dashed line shows homicides by year in a counterfactual synthetic Philadelphia. The vertical line at 2018 divides the pre-period and the post-period, defined here by when District Attorney Larry Krasner took office

measures using the 2017–2019 post-period show a strong match to the graphical measures. The DiD estimator here rises to 99.81 homicides per year ($p = 0.0125$), compared to the 74.79 homicides calculated using the 2015–2019 post-period, demonstrating the acceleration of the effect of de-prosecution on homicides following Krasner's election.

Considering another alternative model, the treatment break for de-prosecution can be assigned as 2018, when Krasner formally took office (during the most intensive period of de-prosecution). The synthetic control model with 2018 as the break point is shown in Figure 6.

Once again, the statistical differences are strong. The DiD estimator is 89.35 homicides per year ($p = 0.125$). The pre-period trends matching for 2010–2017 is not as precise as the preperiod match for 2010–2014 or 2010–2016, but it is still comparable between synthetic Philadelphia and real Philadelphia. Interestingly, the *Synth* algorithm chose somewhat different cities to create synthetic Philadelphia when using 2018 as the treatment date, with the following cities selected: Baton

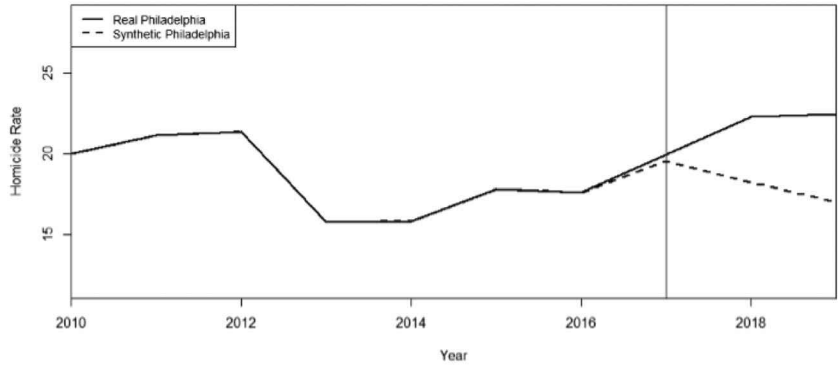

FIGURE 7 Using homicide rates instead of raw number of homicides—Synthetic control plot: Philadelphia versus nonprogressive cities. The solid horizontal line shows homicide rates by year in real Philadelphia. The dashed line shows homicide rates by year in a counterfactual synthetic Philadelphia. The vertical line at 2017 divides the pre-period and the post-period, defined here by the election of District Attorney Larry Krasner

Rouge, Detroit, Los Angeles, New Orleans, and New York. Consistent with the main model, the algorithm selected cities with historical issues of poverty and violence. When using 2017 or 2018 as the cutoff for the treatment period, it is difficult to ignore in the graphical illustrations that the de-prosecution effects on homicides began before both of those dates, lending credence to the decision to use 2015 as the beginning of the de-prosecution regime in the main model.

Overall, estimates remain substantively similar whether the impact of de-prosecution is measured based on when Seth Williams began de-prosecuting in 2015, when Larry Krasner was elected in 2017, or when Krasner took office in 2018. Use of any of these treatment periods shows a statistically significant association between de-prosecution and a large increase in homicides. The parallel results likely exist because the Williams time period, with admittedly a less-pronounced application of de-prosecution (see Table 2), can either be viewed as the beginning of de-prosecution plus a lag period or as Williams "seeding the field" for Krasner's prosecutorial regime so that a lag period was not necessary for the latter's de-prosecution strategy to have an effect. This article is testing the policy of de-prosecution, not a particular person.

The second alternative modeling strategy here is converting the analysis based on the raw number of homicides to an analysis based on the homicide rate. There are three cautionary notes to doing this. First, the inclusion of population as a predictor in the original analysis essentially addresses the rate issue. Second, the donor pool is all large U.S. cities, and thus the basic comparisons should yield valid results. Third, the originator of the synthetic control method has explicitly warned that overfitting may occur and could interfere with the validity of the underlying algorithm where the algorithm is used with incorrect units or incompatible contexts (Abadie, 2021). Nevertheless, to address potential challenges, Figure 7 is a synthetic control analysis of Philadelphia using homicide rates and the Krasner election in 2017 to delineate the post-period.

Figure 7 shows that the use of the homicide rate in place of the raw number of homicides produces a graph that is visually and intuitively similar to the basic analysis using the native unit of homicides. However, caution must be advised. The algorithm selects every city in the donor pool to contribute some small percentage toward the total comparison (with the exception of Hialeah). This result is contrary to what the creator of the synthetic control method suggests is the appropriate functioning of the algorithm, which relies on a sparse selection of donors (Abadie, 2021). This statistical imprecision may be caused by the compression of the units of comparison when

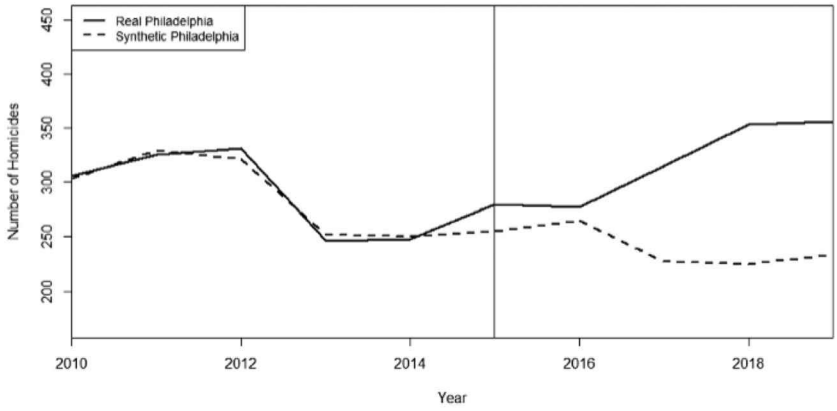

FIGURE 8 Synthetic control plot: Philadelphia versus all cities. The solid horizontal line shows homicides by year in real Philadelphia. The dashed line shows homicides by year in a counterfactual synthetic Philadelphia. The vertical line at 2015 divides the pre-period and the post-period

employing homicide rates rather than the free flow of individual homicides and population. Use of homicide rates produces an incredibly exact preperiod match in Figure 7, reflecting the exact overfitting issue warned about by Abadie.

However, even accepting the fact that use of the homicide rates may skew the accuracy of the model, the strength of the overall results does not change much. The DiD estimator for the homicide rate in Philadelphia is an additional 4.06 homicides per year per 100,000 residents, a very large change. The implied *p*-value is 0.0370.

4.3 | Testing Philadelphia against all cities

An alternative testing strategy is to create a synthetic control model comparing Philadelphia to all of the other 99 largest cities in the United States. This testing theory eliminates the categorization of the prosecutors' offices as traditional, middle, or progressive, both as a predictor and to exclude potentially treated cities.

I ran the synthetic control algorithm using Philadelphia as the treatment city and included all 99 of the other cities as potential donors. I also removed the classification of the prosecutors' offices as a variable. The algorithm chose the same donor cities, albeit with slightly different contributions per city: Detroit (0.469), New Orleans (0.334), and New York (0.197). The *p*-value changed from 0.0120 in the main model to a *p*-value of 0.0202 when including the progressive prosecutors' offices, almost doubling the *p*-value. The result remains statistically significant, but it is clear that inclusion of the progressive prosecutors' offices in the main model decreases the statistical impact, indicating that exclusion of those offices as subject to the de-prosecution policy may have been justified. The synthetic control plot for this alternative modeling is shown in Figure 8.

4.4 | Altering donor pool by eliminating major donors

The next possible robustness check is to alter the donor pool. The largest percentage contributor in the initial synthetic control method findings was Detroit (0.468 contributor). As a

robustness "leave-one-out" check, I ran the synthetic control model again, this time excluding the city of Detroit as a potential donor. The results are substantively unchanged. The pre-period match degrades by a small amount, but the ultimate homicide differential by 2019 remains large (100+ homicides). The algorithm replaces Detroit with Los Angeles, another large city that is comparable to Philadelphia. The *p*-value changes infinitesimally, from 0.0120 to 0.0122. Thus, the results hold even with the major donor city excluded. This enhances confidence in both the results and the underlying algorithm.

Next, I repeated the process, this time excluding the second largest donor, which is New Orleans (0.334). The algorithm replaced New Orleans with Stockton. The overall DiD estimate changed slightly, to 79.53 homicides per year. The *p*-value was slightly higher, at 0.0123, but essentially unchanged. Leaving out the smallest original donor, New York (0.198), also had a minimal impact. Los Angeles replaced New York, and the relative proportions of the donors changed slightly. Once again, the ultimate homicide differential by 2019 was over 100 per year. Even though New York was the smallest original donor, the *p*-value changed to 0.0244 when the city was excluded.[14]

Overall, leaving out particular donor cities did not alter the basic results by anything more than minor changes. The conclusions and the algorithm are not overly sensitive to the inclusion or exclusion of either selected or nonselected donor cities.

4.5 | Testing other de-prosecuting cities

An interesting validity check is to switch Philadelphia with other de-prosecution regimes and rerun the synthetic control model. Chicago and Baltimore are potential choices because of their de-prosecution strategies taking place at roughly the same time period as Philadelphia and because the cities are demographically comparable.

Chicago has some similarities to the Philadelphia story. In an economically and ethnically diverse city with a history of violence, progressive prosecutor Kim Foxx unseated a more traditional prosecutor in 2016. Foxx's predecessor Anita Alvarez faced a series of challenges (police scandals and the Laquan McDonald shooting) that led to experimenting with de-prosecution even before Foxx was elected. Thus, it is possible to run the synthetic control method using Chicago as the treatment city with the same pre-period (2010–2014) and post-period (2015–2019), as well as using the same potential donor pool, providing balanced and sufficient data. The plot comparing real Chicago to a synthetic counterfactual Chicago composed of the nonprogressive cities is produced here as Figure 9. The DiD mean estimator rises to 169.60 homicides per year for Chicago, compared to 74.79 for Philadelphia. The results are statistically significant at the $p < 0.01$ level, even stronger than for Philadelphia.

Baltimore provides another testing analogy to Philadelphia. Baltimore State's Attorney Marilyn Mosby, elected in 2014, was one of the earliest prosecutors to run successfully on a de-prosecution platform. Baltimore also is a city with a history of violence and poverty. Thus, running the synthetic control algorithm with Baltimore as the treatment city is a valuable test of the de-prosecution theory. The synthetic control plot for Baltimore is shown as Figure 10. Once again, a de-prosecuting city produces a significantly greater number of homicides than the synthetic counterfactual. The DiD mean estimator for Baltimore is 70.62 homicides per year (despite having less than half the population of Philadelphia) and the *p*-value is 0.01219.

Accordingly, Chicago and Baltimore provide further evidence in favor of the hypothesis that the de-prosecution strategy is associated with rising homicide numbers in an economically challenged city. No two cities are exactly the same. However, the de-prosecution hypothesis holds across these

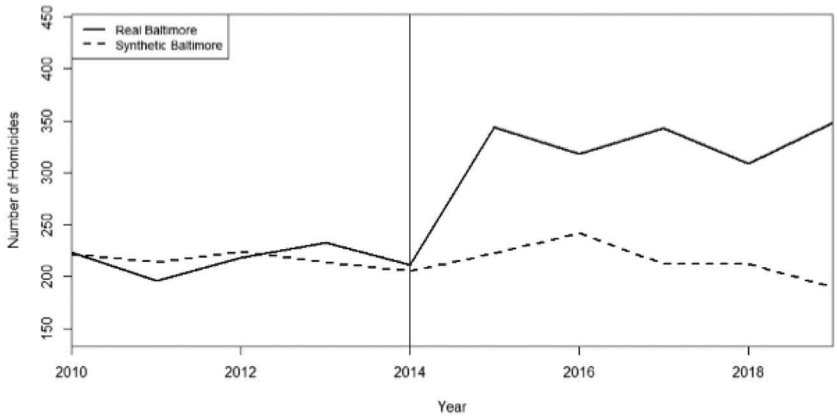

FIGURE 9 Synthetic control plot: Chicago homicides compared to nonprogressive cities. The solid horizontal line shows homicides by year in real Chicago. The dashed line shows homicides by year in a counterfactual synthetic Chicago. The vertical line at 2015 divides the pre-period and the post-period

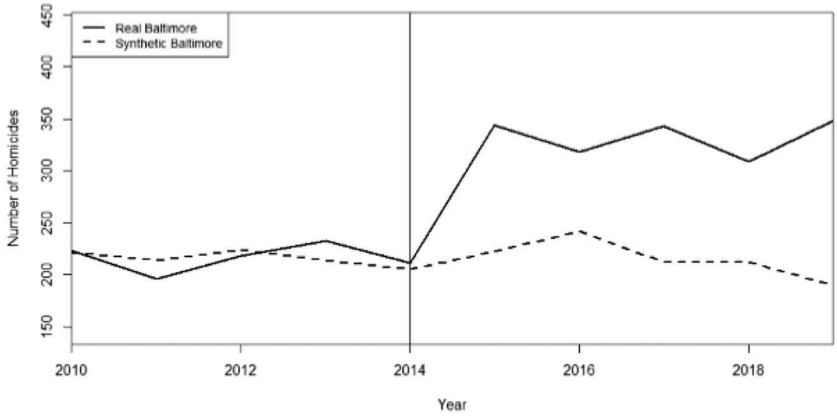

FIGURE 10 Synthetic control plot: Baltimore homicides compared to nonprogressive cities. The solid horizontal line shows homicides by year in real Baltimore. The dashed line shows homicides by year in a counterfactual synthetic Baltimore. The vertical line at 2014 divides the pre-period and the post-period

different locations, police departments, environmental conditions, and many other background factors.

4.6 | Testing other crimes as dependent variable

An interesting question here is whether other crimes are as sensitive to de-prosecution as homicides. Homicides were chosen as the dependent variable because homicide numbers are reliable, not subject to manipulation, and are publicly notable. In order to test the impact on other crimes, I ran the same synthetic control method, but changed the dependent variables to burglary (a property crime) and robbery (a violent crime), as reported in UCR data. Once again, I used Philadelphia as the treatment city, used the same donor pool, and employed the same independent variables.

Neither burglary nor robbery offenses showed a statistically significant difference between real and synthetic Philadelphia during the postperiod (2015–2019) when the de-prosecution policy was employed in Philadelphia. There are three possible theories to explain this result. First, de-prosecution may have no effect on the number of burglaries or robberies being committed. Second, the result may be driven by unreliable underlying data. As opposed to homicides, which are reported accurately, the number of burglaries and robberies reported via the UCR is subject to underreporting, misclassification of crimes, and missing data. The FBI explicitly cautions in the UCR that such data are questionable and are sometimes entirely missing. Approximately 20% of the data that I used to calculate burglary and robbery offenses had to be imputed from other years. Third, burglary and robbery may be subject to a feedback loop with the police and residents. As prosecutors stop allowing such offenses to be charged, dismiss these offenses, or do not pursue them through sentencing, it is possible that residents stop reporting and/or the police stop investigating and making arrests for burglary and robbery, or law enforcement may classify these offenses as other crimes (e.g., thefts). Homicides are not subject to that particular feedback loop because an intentional killing will still show up in the official statistics as a homicide, separately from any arrests, investigative efforts, or classification issues. These results for other crimes and the possible causal channels merit further research.

4.7 | Assessing proxy of progressive prosecutors signaling de-prosecution

Another area that merits a validity check is the proxy used in this study for progressive prosecutors engaging in a de-prosecution policy. Every categorized progressive prosecutor has endorsed the strategy of prosecuting substantially fewer cases. However, actual de-prosecution data were available for only a few prosecutors' offices, unlike the granular data I was able to gather for Philadelphia. It is possible to do some creative analysis on the "progressive = de-prosecution" proxy by comparing the counties immediately surrounding Philadelphia, all of the counties in Pennsylvania, and another progressive prosecutor's office.

First, I compare the cases sentenced in Philadelphia to the cases sentenced in the three large suburban Pennsylvania counties that border Philadelphia: Bucks County, Delaware County, and Montgomery County. Sentenced cases can be considered the ultimate measure of de-prosecution. Those three counties had elected district attorneys during the 2010–2019 time frame who would be classified as "traditional" or "middle." If the three surrounding counties also saw large drops in cases sentenced similar to Philadelphia, then the decline in sentenced cases could be a regional phenomenon. However, no such drop was observed. As shown in Table 5, the three other counties maintained relatively stable numbers of sentencings during the 10-year period, with nothing like the decline in cases sentenced demonstrated by Philadelphia. From 2010 to 2019, Montgomery County started at 5887 sentencings and ended at 5504 sentencings; Bucks County started at 4946 sentencings and ended at 3247 sentencings; and Delaware County started at 5790 sentencings and ended at 5082 sentencings.

Looking at the big picture, by 2019, each suburban county was sentencing more cases in their respective Courts of Common Pleas than Philadelphia.[15] This means that the 35–45 prosecutors in each of these suburban offices were handling more Common Pleas sentencings than the 300+ prosecutors in the Philadelphia DAO. Philadelphia shows a clear shift from regional prosecution norms.

Another way to test the significance of the decline of prosecutions in Philadelphia is to compare the number of sentencings in Philadelphia to statewide sentencings for the rest of Pennsylvania.

TABLE 5 Cases sentenced per year in Courts of Common Pleas: Philadelphia, surrounding counties, and Pennsylvania statewide

Year	Philadelphia	Montgomery	Bucks	Delaware	Statewide
2010	6230	5887	4946	5790	93,063
2011	5147	5521	5147	5396	89,395
2012	7308	5605	5114	5949	89,934
2013	6953	6047	5047	6250	95,265
2014	7252	5711	3883	5802	93,180
2015	4688	4485	4092	5603	88,982
2016	5986	4997	3901	5580	90,604
2017	4423	6156	4252	5702	88,466
2018	3609	5379	3680	5394	87,640
2019	2195	5504	3247	5082	84,585

Note: This chart aggregates the total of cases sentenced in each listed county and statewide for the years 2010–2019. The statewide totals exclude the sentencings from Philadelphia in order to capture the differences in sentencings for the rest of the commonwealth.

Source: Pennsylvania Sentencing Commission.

That comparison also is captured in Table 5. As with the suburban counties around Philadelphia, the statewide sentencing numbers show considerable homogeneity. From 2010 to 2019, the highest total of statewide sentences was 95,265 and the lowest total was 84,585 sentencings. This represents a variation of just 11% over the 10-year period. By comparison, Philadelphia saw approximately 70% fewer sentencings during the de-prosecution period compared to the peak period of sentencings. Thus, de-prosecution in Philadelphia represents a distinct break from statewide norms.

Finally, it is worth comparing Philadelphia's de-prosecution policy against another office classified as "progressive" to determine if de-prosecution is occurring. For this analysis, I used charging information from St. Louis because such information was publicly available. The St. Louis Circuit Attorney is classified as "progressive" in this article. For the year 2019, the St. Louis police requested 7045 felony charges; the St. Louis Circuit Attorney's Office approved 1641 of the charges, a 23% approval rate (or a 77% de-prosecution rate) (Byers et al., 2020). Examining time trends contained in official court records for the city of St. Louis also is useful. During 2010, a total of 9911 criminal cases were charged in St. Louis. By 2019, a total of only 6425 criminal cases were charged in St. Louis, a drop of over 3000 cases prosecuted per year, a 35% reduction (Annual Judicial Reports for Missouri [courts.mo.gov]). Accordingly, it appears that St. Louis is following the same de-prosecution strategy as Philadelphia, just not as pronounced. Public reports show a similar pattern of de-prosecution in Chicago; during the first 3 years of the tenure of Cook County State's Attorney Kim Foxx, the office dropped all charges against 29.9% of all felony defendants (Jackson et al., 2020). Baltimore, another district attorney's office classified as "progressive" here, stated publicly that it has been following and would continue to follow a de-prosecution strategy (Vlamis, 2021). In sum, the classification of progressive prosecutors appears to be a fair proxy for the de-prosecution strategy.

4.8 | Adding other predictors

Another potential robustness check here is to include additional predictive variables/controls to the model to account for other potential influences. The selected variables of homicides,

population, median income, homicide clearances/clearance rates, and prosecutor classification capture a significant amount of obvious and hidden information. However, other variables can be added to test robustness. Specifically, I added the poverty rate, labor force, employment totals, unemployment totals, and the unemployment rate to the initial independent variables. These variables were added individually and then collectively. The additional variables had no effect on the model outcomes. The signal produced by homicides as a dependent variable and the original independent variables appear to be sufficiently strong to produce consistent results.

In addition, I ran the synthetic control tests using two variations on the strategy of classifying the prosecutors' offices. First, in the main model, I classified the offices on a year-by-year basis, with a classification as progressive, middle, or traditional for each year from 2010 to 2019. Second, as an alternative, I classified the offices with a single weighted classification for the entire post-period. As with the addition of the other variables, this additional classification technique had no impact on the underlying results.

5 | DISCUSSION AND POLICY IMPLICATIONS

If de-prosecution is associated with an increase in homicides in Philadelphia, the potential mechanisms for this relationship must be explored. De-prosecution can be operationalized as a bundled combination of primary effects, secondary effects, and feedback loops. The Philadelphia DAO has publicly announced that it is not prosecuting certain categories of crimes, while at the same time effectively de-prosecuting further categories not publicly announced. As the police department realizes that such crimes will not be charged or will not be prosecuted to conviction, there is a lesser incentive for police to make arrests for such offenses. In addition, the Philadelphia DAO has publicly declined to seek charges related to protests directed at the police themselves, and instead has charged police officers for conduct during those protests (Melamed, 2020; Palmer, 2021). This combination of de-prosecution conduct hypothetically could create a feedback loop leading to de-policing, as members of the Philadelphia Police Department become less aggressive in making discretionary arrests, which in turn might lead to more homicides.

Moreover, as would-be offenders realize that they will not be prosecuted for certain offenses and that the police are engaging in lesser efforts to arrest them, those offenders may be more likely to engage in criminal behavior, with some of that behavior leading to homicides. For civilian witnesses—already reluctant to testify in criminal cases—de-prosecution adds another disincentive to risking public disclosure of their cooperation with law enforcement. In a secondary effect, experienced prosecutors may not remain working in an office where de-prosecution is the norm, leading to fewer experienced prosecutors capable of trying and convicting offenders at every level of offense, once again potentially leading to more homicides. Philadelphia has seen an exodus of experienced prosecutors, as have other de-prosecuting cities like St. Louis (Melamed et al., 2021; O'Dea & Currier, 2021). De-prosecution, like over-prosecution, has many potential facets and unintended consequences.

Given these bundled attributes of de-prosecution, the operational channel between de-prosecution and homicides may be explained by three interdependent factors. First, the cohorts of likely homicide defendants and homicide victims have a large overlap (Broidy et al., 2006; Hiltz et al., 2020). Fewer prosecutions and sentencings in Philadelphia cause fewer people to be incarcerated, and more potential homicide offenders and victims interacting, thereby resulting in more homicides.

Second, fewer prosecutions and sentencings in the area of drug trafficking and gun felonies play a particularly significant role. As demonstrated by the Philadelphia data shown in Table 2, the Philadelphia DAO has substantially reduced the number of drug trafficking and VUFA felony prosecutions and sentences. Two of the most accepted risk factors for murder historically have been drug trafficking and weapons possession (Loeber et al., 2005; Loeber & Ahonen, 2013). Most Philadelphia homicides involve firearms. Thus, when the Philadelphia DAO substantially decreased the number of people being sentenced for drug trafficking and VUFA felonies, this may result in a specific category of potential homicide offenders not incapacitated.

Moreover, many homicides in Philadelphia, like in other large urban centers, have direct ties to drug trafficking organizations.[16] The homicides involving drug dealing crews may be the result of territorial battles, disputes over money/disrespect/women, or simply long-held grudges. Homicide offenders and victims may both be involved in drug trafficking, leading to homicides taking place in an area of high drug trafficking. Potential witnesses to and sources of information about these homicides usually are other people involved in drug trafficking who may not be willing to cooperate in investigations unless they are facing significant legal sanctions, usually through drug prosecutions. The lack of drug trafficking prosecutions could therefore result in a lack of witnesses and sources of information necessary to solve and prosecute homicides.

The third mechanical factor potentially mediating the relationship between the de-prosecution strategy and an increase in homicides is retaliatory murders. As noted above, reduced prosecutions and sentencings lead to a greater number of potential homicide offenders/victims on the street, and fewer drug trafficking prosecutions lead to fewer witnesses and sources of information who can help clear homicide cases. Consider a scenario where a member of Gang A kills a member of Gang B. If the Gang A murderer is not arrested and successfully prosecuted because the police lack the leverage to get information from witnesses created by other prosecutions, particularly drug prosecutions, then Gang B will perceive that the criminal justice system is not working. As a result, Gang B is likely to take matters into their own hands and retaliate by killing a member of Gang A. Once again, this follow-up homicide is unlikely to result in an arrest and prosecution under the de-prosecution model. The result is a series of retaliatory homicides (Kubrin & Weitzer, 2003; Papachristos, 2009). As evidence of this concept, the closure rate for the Philadelphia Police Department regarding homicides has been declining rapidly during the de-prosecution period (Murphy, 2020).[17]

In addition to the above-described mechanisms, foundational criminological and economic theory offers a classical explanation for the interplay between de-prosecution and the increasing number of homicides in Philadelphia. Deterrence is built on the trinity of certainty, swiftness, and severity of sanctions (Beccaria, 1764; Becker, 1968; Bentham, 1789). With de-prosecution, there is a decreasing certainty of apprehension in Philadelphia. Sanctions are not swift with de-prosecution; they are delayed or nonexistent. In the relative absence of prosecutions and sentencings, there is no severity of sanctions, perceived or actual. Under these circumstances, the de-prosecution strategy as used in Philadelphia undermines deterrence, resulting in more homicides.

Competing theories of causation for increases in the number of homicides should be considered. It is conceivable that the more lenient sentences applied by progressive prosecutors for violent crimes like murder could lead to an increase in homicides. However, the expected effect of such sentencing changes should be further downstream, perhaps 10 years out, as defendants who would have been serving 20 years or life were being released after serving only five or 10 years. Moreover, as discussed above, the Philadelphia DAO has not changed significantly in its conformity to the sentencing guidelines during the 2015–2019 de-prosecution period.

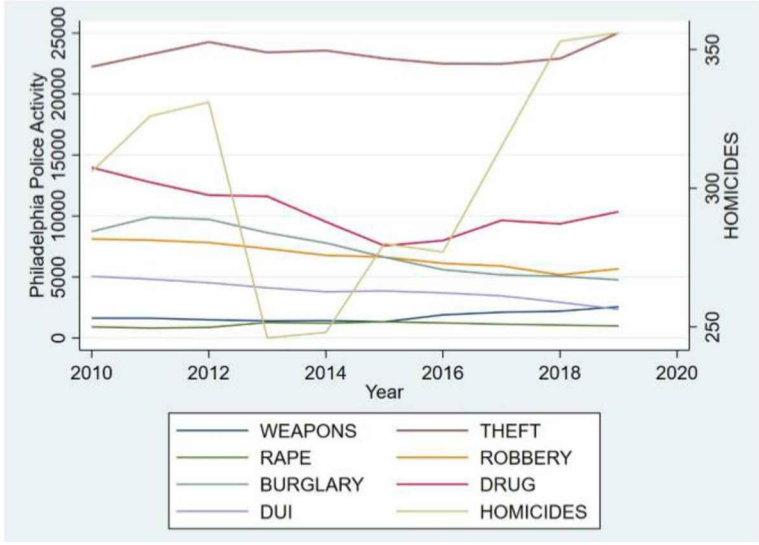

FIGURE 11 Philadelphia Police Department activity and homicides (2010–2019). The various colored lines show the Philadelphia Police Department incident statistics for different crimes from 2010 to 2019, compared to the number of homicides in Philadelphia. The underlying data do not differentiate within drug offenses (e.g., possession vs. trafficking) or weapons offenses (e.g., firearms vs. knives), although the data for weapons offenses track public reports about the number of VUFA arrests in Philadelphia (Palmer et al., 2021).
Source: OpenDataPhilly.Org
[Color figure can be viewed at wileyonlinelibrary.com]

Another hypothesis is that the increase in homicides in Philadelphia could be linked to a change in police behavior, perhaps as a negative response to civilian protests or progressive prosecutors. This so-called "Ferguson Effect" attributes a rise in violent crime to de-policing following protests after the officer-involved shooting death of Michael Brown in Ferguson, MO in 2014, although the theory has been hotly contested (Cheng & Long, 2022; MacDonald, 2019; Nix & Wolf, 2018; Rosenfeld, 2016). Accepting this de-policing theory as correct, it would apply in a uniform fashion to the large cities in the United States, and thus arguably is not a confounding variable when testing the 100 largest cities during the 2015–2019 post-period. Essentially the Ferguson Effect would be controlled for when testing these cities, and the differential measured in this article goes beyond the de-policing effect. Alternatively, if the Ferguson Effect is only present or more significantly present in cities where de-prosecution is taking place, then such de-policing is more logically explained as a feedback loop caused by de-prosecution, as has been discussed above. Thus, under either interpretation of the de-policing theory, it does not alter the results here. To avoid some of these exact arguments, this study intentionally pre-dates and excludes the time period of the George Floyd-related protests.

It is also useful to examine the de-policing issue strictly as applied to Philadelphia. I accessed Philadelphia Police Department data from OpenDataPhilly, a publicly accessible aggregation of data on police activity for crime incidents in Philadelphia (OpenDataPhilly.org). This data set allows an examination of police activity by crimes from 2010 to 2019. Figure 11 tracks Philadelphia Police Department activity broken down by specific categories of crimes, overlaid against Philadelphia homicides. Figure 11 shows little difference in police activity year-over-year within each crime category. Meanwhile, the number of homicides changes drastically, as homicides are

responding to other forces (proposed in this article to be de-prosecution). The number of weapons violations bears particularly strong scrutiny. The weapons violations from 2010 to 2019 are as follows: 1631, 1625, 1490, 1406, 1425, 1324, 1899, 2111, 2195, and 2560. Thus, weapons violations have been rising according to Philadelphia Police Department data, even as firearms sentencings in Philadelphia have been falling drastically (see Table 2). The precise issue of rising gun arrests and falling gun convictions has been the subject of public controversy in Philadelphia during the past year (Palmer et al., 2021). Overall, the data in Figure 11 suggest that the change in behavior in Philadelphia is not with the police department, but with the Philadelphia DAO. As a free-standing issue, the existence and effect of de-policing remains a valid and open question, but it should not affect the results here.

A final alternative causal channel for the rise in homicides is that the media attention given to progressive prosecutors, with their amplified views and policies on de-prosecution and lighter sentences, is sending a "message to the streets" that undermines deterrence. Such a theoretical signaling argument would be extremely difficult to quantify. At the least, ethnographic studies should be conducted across a representative sample of cities to test this theory.

The findings here suggesting an association between de-prosecution and more homicides raises three policy considerations. The first is strictly a normative choice for the citizens of large cities. Progressive prosecutors were elected, in part, because the citizens wanted fewer prosecutions and sentencings. Progressive prosecutors have delivered fewer prosecutions and sentencings, across different types of crimes. The citizens of these cities now must weigh the value of such de-prosecution methods against the possibility that de-prosecution could be linked to increases in homicides. Victims of these homicides are overwhelmingly impoverished minorities. In 2019, over 85% of the homicide victims in Philadelphia were Black. The homicides were concentrated in the poorest sections of the city: North Philadelphia, West Philadelphia, and Southwest Philadelphia. Voters will have to balance their preferences for the volume of prosecutions against the volume of homicides in their communities.

The second policy concern addresses resources and the budget for the cities where de-prosecution is taking place, many of which are in financially distressed areas. If the local district attorney's office is prosecuting and sentencing vastly fewer crimes, then presumably the office needs considerably fewer prosecutors and staff. Using Philadelphia as an example, if the number of sentencings has been cut by 70%, some reduction in the DAO budget might be considered, particularly in a city as poor as Philadelphia.[18] In fact, two of the progressive candidates in the 2021 primary election for the Manhattan District Attorney position expressly promised to cut the size of that office in half to reflect the reduced role of the prosecutor under a de-prosecution policy (Bromwich, 2021). Thus, de-prosecuting offices might have reduced budgets, reflecting the degree of de-prosecution. The budgets of prisons, police, and public defenders might also be affected by a de-prosecution regime. There may also be positive economic trade-offs with de-prosecution regimes, all of which can be addressed in budget discussions.

Third and finally, the debate for prosecutors and scholars is to identify what is the optimal volume of prosecutions/sentencings to keep the number of homicides to a minimum in any particular city. Incarcerating everybody or nobody would have clear impacts on homicides, but neither strategy is legally or ethically acceptable. The challenge is to find the ideal combination of the right number and type of prosecutions to keep the number of homicides as low as possible, without becoming a draconian police state. In a dynamic system like criminal justice, this "prosecutorial sweet spot" will always be a moving target. Prosecutors need to factor in national and local factors like the economy, politics, how hot or cold the year is, gang issues, and a myriad of other variables. What works in Miami might not work in Minneapolis.

The more important point is that prosecutors need to think actively and intelligently about the question of how many and what type of prosecutions will limit homicides in their jurisdiction. Using a regression analysis with 10 or 20 years of data from their city might give prosecutors some predictive insight into how their prosecutorial decisions may affect the homicide totals. There is no one-size-fits-all answer to the question of how many prosecutions/sentencings and how many homicides are the statistically perfect number, but asking the question will lead to intelligent, focused, and data-driven prosecutions.

There are a number of potential areas for future research to inform de-prosecution debates, especially when more data become available as de-prosecution is used in more cities and for longer periods of time. It would be useful to measure precisely the number of cases prosecuted and sentenced for each of the top 100 prosecutors, as was possible for all of the prosecutors in Pennsylvania. Such data for each city simply were not available, with relatively few prosecutors' offices sharing and/or collecting such information. Moreover, while all progressive prosecutors seem to be engaged in de-prosecution, there may be subtle differences in the manner and means of de-prosecution. For instance, delineating which offices are de-prosecuting felonies and which are only de-prosecuting misdemeanors would provide more nuanced information.

There are two subtle trends that are suggested in the data, beyond the scope of this article, but worthy of further research. First, extremely wealthy cities—with very few areas of historical poverty and violence—may be buffered from de-prosecution causing an effect on homicides, while high-poverty cities with a history of violence may be particularly susceptible to the impact of de-prosecution. Second, some cities may reach a statistical equilibrium for the peak level of homicides based mainly on population. In a final area of potential future research, the effect of de-prosecution on a wide variety of other crimes in addition to homicide should be examined. While I briefly reviewed robbery and burglary as dependent variables, other crimes also should be explored, with the caveat that they are much easier to manipulate and re-classify than homicides, and the underlying data are less reliable.

De-prosecution—the decision not to prosecute certain criminal conduct regardless of whether the crimes were committed—has become an increasingly popular criminal justice strategy. However, the impact of de-prosecution on homicides has not previously been explored from a quantitative perspective. Using a synthetic control, DiD model, this study finds that de-prosecution in Philadelphia in 2015–2019 was associated with a statistically significant increase in homicides. Robustness checks appear to confirm these findings. Going beyond statistics, the homicide victims are overwhelmingly people of color living in the poorest sections of Philadelphia. Calls for less prosecution under the guise of social justice may inadvertently lead to more homicides of minorities, which then degrades social justice. Every criminal justice policy—from ban-the-box to stop-and-frisk—should be evaluated for both intended and unintended downstream effects.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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ENDNOTES

[1] In some cities, the bifurcation between misdemeanors and felonies is formalized by having one prosecutor's office handle misdemeanors and another office handle felonies. See, for example, Scottsdale City Attorney's Office (City Attorney only handles misdemeanor criminal prosecutions, felonies are handled by County Attorney's Office). In Philadelphia, the DAO handles both misdemeanors and felonies.

[2] A small number of misdemeanor convictions are appealed to the Court of Common Pleas as well, but these numbers are not substantial.

[3] In some of the literature addressing progressive prosecutor policies in general, the term "non-prosecution" is conflated with the concept of de-prosecution. A distinction should be drawn. In the criminal justice system, "non-prosecution agreements" are formal agreements where: (1) a defendant or potential defendant agrees to cooperate against others in exchange for non-prosecution; or (2) a corporation resolves potential criminal charges by agreeing to certain monetary fines and conditions of operations going forward in exchange for non-prosecution (Alexander & Cohen, 2015; United States Department of Justice Manual, 9-27-600 *et seq*.). In other words, the potential defendant is offering the government something in exchange for the non-prosecution agreement. De-prosecution, by contrast, is an *ex ante* decision that criminal conduct will not be prosecuted and punished, with no exchange of benefits.

[4] The state of Florida does not contribute to the FBI UCR, so the data were gleaned from county-level information maintained by the Florida Department of Law Enforcement. Where any homicide data for a specific year and city were not listed in the UCR/SHR, the information was retrieved from publicly available sources for specific police jurisdictions.

[5] Some cities, like Los Angeles where George Gascón was recently elected as a progressive prosecutor, are not included on the "progressives" list because this article only covers 2010–2019. The years 2020–2021 saw another new wave of self-identified progressive prosecutors elected (Alexander, 2021; The Crime Report, 2021). Thus, more data about progressive prosecution strategies may be forthcoming.

[6] These figures from the Sentencing Commission exclude the misdemeanor cases assigned to Municipal Court in Philadelphia.

[7] The Philadelphia DAO data dashboard (data.philadao.com), while showing some discrepancies from the official AOPC and Sentencing Commission statistics, describes an even more extreme de-prosecution trend. Per the DAO, Philadelphia currently is dismissing or withdrawing a far greater proportion of cases than they are pursuing to conviction.

[8] There have been some recent declines in the number of Philadelphia police officers; in 2021, the department was 268 officers short of its normal complement of 6380 officers (Dean et al., 2021). However, the number of vacancies is not large and did not become a concern during the 2010–2019 time period examined in this article.

[9] Given a pledge not to prosecute drug possession, it might be expected that these charges would totally disappear. However, the fact that they still exist in a not insignificant number is likely the result of charge bargaining, with defendants arrested for drug trafficking allowed to plead down to drug possession.

[10] With the preperiod match coded to end in 2014, the algorithm actually allows the real-life divergence to begin in mid-2014. This coding anomaly could be smoothed out by excluding the year immediately preceding the treatment, as some authors do, but is left in here for complete transparency.

[11] Virtually every criminal justice policy will have a lag period before effects are felt. Unlike a treatment effect such as the imposition of a new tax, which would have immediately measurable effects, criminal justice policies need to work their way through the criminal justice system and to the street level, both for police and offenders. Thus, many studies attempting to measure effects of criminal justice policies within a year of enactment necessarily will show results that are not statistically significant.

[12] This point about the predicted sparse nature of selected donors may cause a necessary re-examination of prior synthetic control scholarship. Where the number of selected donors comprises a large proportion of the donor pool, this result may indicate potential problems with the underlying calculations or appropriate use of the algorithm.

[13] With a much smaller donor pool of cities, the statistical power here is considerably lower, producing a p-value of 0.994, lacking any statistical significance. For purposes of calculating the p-value and a basic synthetic control plot, the donor cities are Baltimore, Birmingham, Boston, Chicago, Durham, Orlando, and St. Louis.

[14] In addition, all of the underlying analyses were done both including and excluding Las Vegas and Orlando, because of mass shootings in those two cities during the 2010–2019 time period. Neither city (one "progressive"

and one "middle") was selected as a donor by the algorithm used in the synthetic control model. Thus, inclusion or exclusion of either city had no impact on any results.

[15] The suburban counties sentence both felony and misdemeanor cases in their Courts of Common Pleas, whereas the majority of misdemeanor cases in Philadelphia are sentenced exclusively in Municipal Court.

[16] Drug trafficking organizations in Philadelphia usually are not national gangs, but instead are smaller, geographically based street-level crews. Philadelphia remains a regional hub for drug trafficking and continues to have the cheapest and purest heroin in the United States (Liberty Mid-Atlantic High Intensity Drug Trafficking Area Annual Report, 2019).

[17] While the Philadelphia Police Department is publicly reporting clearance rates around 50%, the actual underlying SHR data show that clearance rates for 2018–2019 were in the 20%–30% range.

[18] The 2021 budget for the Philadelphia DAO was in excess of $33 million (City of Philadelphia Fiscal 2021 Operating Budget, 2020 [phila.gov]).

REFERENCES

Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American Statistical Association*, *105*(490), 493–505.

Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative politics and the synthetic control method. *American Journal of Political Science*, *59*(2), 495–510.

Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American Economic Review*, *93*(1), 113–132.

Abadie, A. (2021). Using synthetic controls: Feasibility, data requirements, and methodological aspects. *Journal of Economic Literature*, *59*(2), 391–425.

Acemoglu, D., Johnson, S., Kermani, A., Kwak, J., & Mitton, T. (2016). The value of connections in turbulent times: Evidence from the United States. *Journal of Financial Economics*, *121*, 368–391.

Agan, A., Doleac, J., & Harvey, A. (2021). Misdemeanor *prosecution*. Working Paper.

Agan, A., Doleac, J., & Harvey, A. (2022). *Prosecutorial reform and local crime rates*. Working Paper.

Albonetti, C. (1987). Prosecutorial discretion: The effects of uncertainty. *Law & Society Review*, *21*(2), 291–314.

Alexander, A. (2021). *Progressive prosecutors navigate wary cops, anxious communities*. Bloomberg Law.

Alexander, C., & Cohen, M. (2015). *Trends in the use of non-prosecution, deferred prosecution, and plea agreements in the settlement of alleged corporate wrongdoing*. George Mason School of Law, Law & Economics Center.

AP News. (2021, March 14). Judge allows prosecutors to drop charges in 2012 slaying. AP News.

Bartos, B., & Kubrin, C. (2018). Can we downsize our prisons and jails without compromising public safety? Findings from California's Prop 47. *Criminology & Public Policy*, *17*(3), 693–715.

Beccaria, C. (1764). *On crimes and punishments*. Clarendon Press.

Becker, G. (1968). Crime and punishment: An economic approach. *Journal of Political Economy*, *76*(2), 169–217.

Becker, M., & Klößner, S. (2016). *Computing generalized synthetic controls with the R package MSCMT*. Saarland University.

Becker, M., & Klößner, S. (2018). Fast and reliable computation of generalized synthetic controls. *Econometrics and Statistics*, *5*, 1–19.

Bellin, J. (2019). The power of prosecutors. *New York University Law Review*, *94*(2), 172–212.

Bentham, J. (1789). *An introduction to the principles of morals and legislation*. Prometheus Books.

Bohn, S., Lofstrom, M., & Raphael, S. (2014). Did the 2007 Legal Arizona Workers Act reduce the state's unauthorized immigrant population? *Review of Economics and Statistics*, *96*(2), 258–269.

Broidy, L., Daday, J., Crandall, C., Sklar, D., & Jost, P. (2006). Exploring demographic, structural, and behavioural overlap among homicide offenders and victims. *Homicide Studies*, *10*, 155–180.

Bromwich, J. (2021, March 25). 8 Candidates compete for a job that may involve prosecuting Trump. *New York Times*.

Byers, C., Merano, B., & Martinez, M. (2020, January 16). 'I really thought he was going to kill me'; Attempted carjacking of Lyft driver is among thousands of unprosecuted cases. *5 On Your Side NBC News (St. Louis)*.

Chalfin, A., & Deza, M. (2020). Immigration enforcement, crime, and demography. *Criminology & Public Policy*, *19*, 515–562.

Cheng, C., & Long, W. (2022). The effect of highly publicized police killings on policing: Evidence from large U.S. cities. *Journal of Public Economics*, *206*(9), 104557.

Cipriano, R. (2017, February 10). Philly cops win war against D.A. Who wouldn't prosecute suspects. *Newsweek*.

Cox, J., Meaux, L., Stanziani, M., Coffey, C., & Daquin, J. (2021). Partiality in prosecution? Discretionary prosecutorial decision making and intimate partner violence. *Journal of Interpersonal Violence*, *36*(17-18), 8471–8493.

D'Annunzio, P. J. (2017, October 24). Seth Williams sentenced to 5 years in prison, endures withering criticism from judge. *The Legal Intelligencer*.

Davis, A. (2019). Reimagining prosecution: A growing progressive movement. *UCLA Criminal Justice Law. Review*, *3*, 2–27.

Dean, M., Shaw, J., & Vella, V. (2021, April 23). Police in Philly and beyond are struggling with a shortage of police recruits and a surge in retirements. *Philadelphia Inquirer*.

Donohue, J., Aneja, A., & Weber, K. (2017). *Right-to-carry laws and violent crime: A comprehensive assessment using panel data and a state-level synthetic control analysis*. National Bureau of Economic Research, Technical Report.

Duchneskie, J. (2017, February 11). *Timeline of Seth Williams' career*. Philadelphia Inquirer.

Fair and Just Prosecution. (2018). 21 Principles for the 21st century prosecutor. Brennan Center for Justice.

Flowers, C. (2015, February 20). In praise of Seth Williams. No, really. *Philadelphia Inquirer*.

Gambacorta, D. (2016). November 10. DA's office to release files on police shootings. *Philadelphia Magazine*.

Green, B. (2019). Prosecutorial discretion: The difficulty and necessity of public inquiry. *Dickinson Law Review*, *123*(3), 589–626.

Grier, K., & Maynard, N. (2016). The economic consequences of Hugo Chavez: A synthetic control analysis. *Journal of Economic Behavior & Organization*, *125*, 1–21.

Hiltz, N., Bland, M., & Barnes, G. (2020). Victim-offender overlap in violent crime: Targeting crime harm in a Canadian suburb. *Cambridge Journal of Evidence-Based Policing*, *4*, 114–124.

Jackson, D., Lighty, T., & Marx, G. (2020, August 10). Kim Foxx's record on dropped felony cases as Cook County state's attorney, charted. *Chicago Tribune*.

Kaplan, J. (2021). Uniform Crime Reporting (UCR) program data: Supplementary Homicide reports. Inter-university Consortium for Political and Social Research.

Kingsnorth, R., MacIntosh, R., & Sutherland, S. (2006). Criminal charge or probation violation? Prosecutorial discretion and implications for research in criminal court processing. *Criminology*, *40*(3), 553–578.

Kleven, H., Landais, C., & Saez, E. (2013). Taxation and international migration of superstars: Evidence from the European football market. *American Economic Review*, *103*(5), 1892–1924.

Kubrin, C., & Weitzer, R. (2003). Retaliatory homicide: Concentrated disadvantage and neighborhood culture. *Social Problems*, *50*(2), 157–180.

Levin, B. (2021). Imagining the progressive prosecutor. *Minnesota Law Review*, *105*(3), 1415–1452.

Loeber, R., & Ahonen, L. (2013). Invited address–Street killings: Prediction of homicide offenders and their victims. *Journal of Youth and Adolescence*, *42*(11), 1640–1650.

Loeber, R., Pardini, D., Homish, D., Wei, E., Crawford, A., Farrington, D., Stouthamer-Loeber, M., Creemers, J., Koehler, S., & Rosenfeld, R. (2005). The prediction of violence and homicide in young men. *Journal of Consulting and Clinical Psychology*, *73*, 1074–1088.

Lynch, G. (1998). Our administrative system of criminal justice. *Fordham Law Review*, *66*, 2117–2152.

MacDonald, J. (2019). De-policing as a consequence of the so-called Ferguson effect. *Criminology & Public Policy*, *18*, 47–49.

Marin, M. (2021, April 25). Philly DA report card: The promises Krasner kept (or didn't) in his first term. *BillyPenn*.

Melamed, S. (2020, July 9). Philly has waived all citations against protesters after they said arrests violated their rights. *Philadelphia Inquirer*.

Melamed, S., Palmer, C., & Purcell, D. (2021, December 23). More than 70 lawyers hired by Philly DA Larry Krasner have left. Some say the office is in disarray. *Philadelphia Inquirer*.

Mourtgos, S., & Adams, I. (2019). The effect of prosecutorial actions on deterrence: A county-level analysis. *Criminal Justice Policy Review*, *31*(4), 479–499.

Murphy, D. (2020, September 4). Philly Police: Homicide clearance rate on the decline as murder rates rise. *WHYY (Philadelphia)*.

Nicosia, N., MacDonald, J., & Pacula, R. (2017). Does mandatory diversion to drug treatment eliminate racial disparities in the incarceration of drug offenders? An examination of California's Proposition 36. *Journal of Quantitative Criminology*, *33*, 179–205.

Nix, J., & Wolfe, S. (2018). Management-level officers' experiences with the Ferguson effect. *Policing: An International Journal*, *41*(2), 262–275.

O'Dea, J., & Currier, J. (2021, September 26). 9 Months into second term, St. Louis prosecutor can't keep attorneys on staff. *St. Louis Post-Dispatch*.

Orso, A. (2017, March 13). Tracking District Attorney Seth Williams' shifting stance on juvenile lifers. *PolitiFact*.

Otterbein, H. (2017, March 20). Here's what's behind the sharp left turn in Philly's district attorney race. *Philadelphia Magazine*.

Otterbein, H. (2015, August 31). Seth Williams' month just got even worse. *Philadelphia Magazine*.

Ouss, A., & Stevenson, M. (2021). *Bail, jail, and pretrial misconduct: The influence of prosecutors*. Working Paper.

Owens, E. (2015, October 22). Seth Williams represents what's wrong with Philadelphia's justice system. *Philadelphia Metro*.

Palmer, C. (2021, February 12). Philly DA refiles charges against former police inspector Joe Bologna in assault of student at the George Floyd protests. *Philadelphia Inquirer*.

Palmer, C., Purcell, D., Newall, M., & Dean, M. (2021, March 31). Philly gun arrests are on a record pace, but convictions drop under DA Krasner. *Philadelphia Inquirer*.

Papachristos, A. (2009). Murder by structure: Dominance relations and the social structure of gang homicide. *American Journal of Sociology*, *115*(1), 74–128.

Philly Law Blog. (2014, August 1). FOP President John McNesby can't stop saying stupid things. Philly Law Blog.

Pilkington, E. (2016, June 30). America's deadliest prosecutors: Five lawyers, 440 death sentences. *The Guardian*.

Pinotti, P. (2015). The economic costs of organised crime: Evidence from Southern Italy. *Economic Journal*, *125*, 203–232.

Rice, J. (2017, March 23). A "reformer" who reformed nothing. *Slate*.

Robbins, M., Saunders, J., & Kilmer, B. (2017). A framework for synthetic control methods with high-dimensional, micro-level data: Evaluating a neighborhood-specific crime intervention. *Journal of the American Statistical Association*, *112*(517), 109–126.

Roebuck, J. (2015, July 28). Acquitted narcotics officers sue city's top brass for defamation. *Philadelphia Inquirer*.

Romain, D., & Freiburger, T. (2013). Prosecutorial discretion for domestic violence cases: An examination of the effects of offender race, ethnicity, gender and age. *Criminal Justice Studies*, *26*(3), 289–307.

Rosenberg, T. (1995, July 16). The deadliest D.A. *New York Times*.

Rosenfeld, R. (2016). *Documenting and explaining the 2015 homicide rise: Research directions*. NCJ Number: 249895. National Institute of Justice.

Saunders, J., Lundberg, R., Braga, A., Ridgeway, G., & Miles, J. (2015). A synthetic control approach to evaluating place-based crime interventions. *Journal of Quantitative Criminology*, *31*(3), 413–434.

Sklansky, D. (2017). The changing political landscape for elected prosecutors. *Ohio State Journal of Criminal Law*, *14*, 647–674.

Stefano, J. (2020). May 16. Anarchy is no cure for coronavirus — or injustice. *The Hill*.

Spohn, C. (2018). Reflections on the exercise of prosecutorial discretion 50 years after publication of the challenge of crime in a free society. *Criminology & Public Policy*, *17*(2), 321–340.

The Crime Report. (2021). November 4. Criminal justice reform 'will save democracy': Krasner. The Crime Report.

Thompson, C. (2014). December 16. Two PA legislators charged by Philadelphia DA in legislative sting case. *PennLive*.

Stuntz, W. (2001). The pathological politics of criminal law. *Michigan Law Review*, *100*(3), 505–600.

Vlamis, K. (2021). March 28. Baltimore will no longer prosecute for drug possession, prostitution, or other low-level crimes after pandemic experiment 'success'. *The INSIDER*.

WHYY Staff. (2009). November 4. Democrat Seth Williams wins Philadelphia D.A. race. WHYY.

Williams, M., Jr. (2017). *Gun violence in black and white: Evidence from policy reform in Missouri*. Working Paper, MIT.

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APPENDIX

Figure A1, Figure A2, Figure A3, Figure A4, Figure A5, Figure A6, Figure A7, Figure A8, Figure A9, Figure A10

TABLE A1, TABLE A2, TABLE A3, TABLE A4, TABLE A5

Progressive criteria (must have 10 out of 15):

-self-identified
-stated intention to prosecute fewer cases or confirmatory data
-ban on death penalty
-favors decriminalizing drugs
-cites to systemic racism or criminal justice system as racist
-cites to mass incarceration as significant problem
-stated preference to end cash bail
-implicit bias training or implicit bias as campaign point
-no experience as line state-court prosecutor
-defense/civil rights experience only
-supports ending use of mandatory minimum sentences

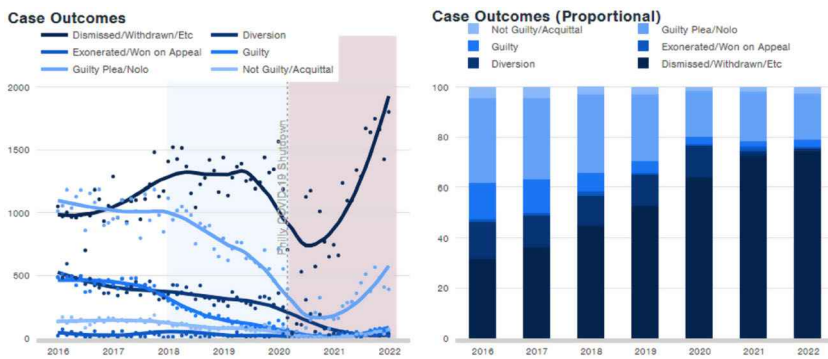

FIGURE A1 Screen shot of Philadelphia DAO dashboard regarding case outcomes [Color figure can be viewed at wileyonlinelibrary.com]

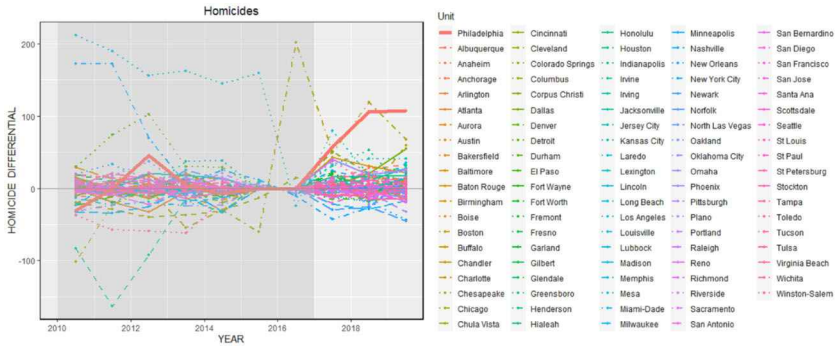

FIGURE A2 Placebo plot, MSCMT package: Philadelphia compared to all cities. This synthetic control placebo plot was produced using the *MSCMT* package in R. The *x*-axis shows the increase in number of homicides over expected levels. The *y*-axis shows the year. Philadelphia is denoted by the solid red line. This graph includes all cities for a broad perspective, both nonprogressive and progressive cities. Las Vegas and Orlando were excluded because of mass shootings in the areas during the relevant time period [Color figure can be viewed at wileyonlinelibrary.com]

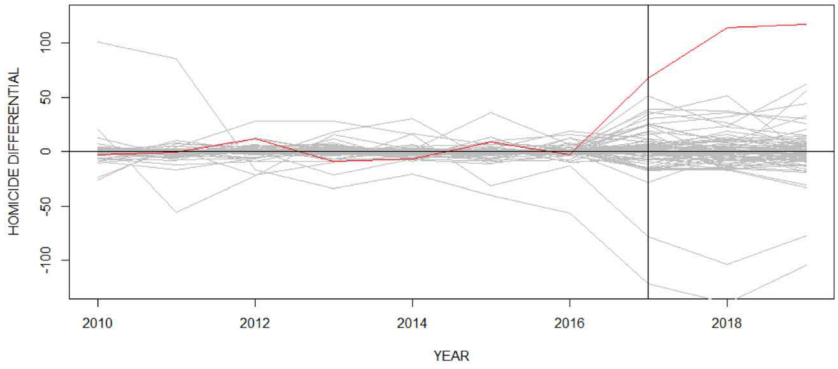

FIGURE A3 Using Krasner election in 2017 to define postperiod—Placebo plot: Philadelphia versus nonprogressive cities. The graph shows Philadelphia in a red line and the nonprogressive cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide differential for each year calculated from the expected mean number of homicides. The vertical line at 2017 divides the pre-period and the post-period, defined here by the election of District Attorney Larry Krasner [Color figure can be viewed at wileyonlinelibrary.com]

-support for sanctuary cities
-funded by Soros PAC
-less than eight years in office
-heavily Democratic area

Discussion: These factors merit some explanation. The stated intention to prosecute fewer cases (or confirmatory data) is a definitional indicator of a de-prosecution regime. The other criteria are factors for progressive prosecution, defined here to include de-prosecution. Self-identification as a progressive prosecutor is a factor, but not controlling. The following factors are considered classic indicators of progressive prosecutors, mainly because of claims of racially disparate impacts:

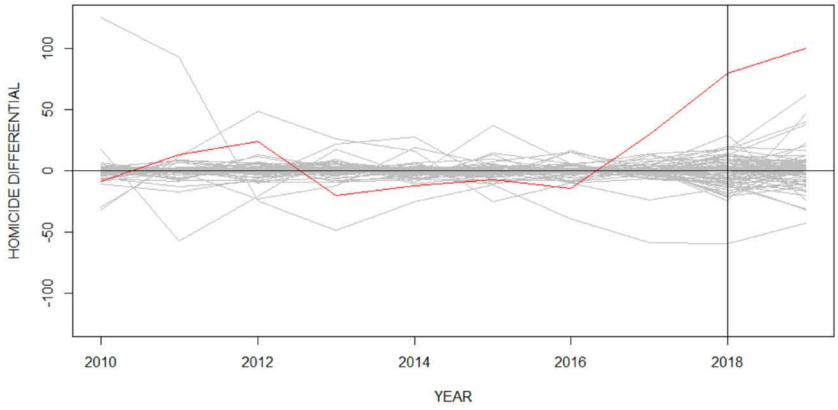

FIGURE A4 Using Krasner election in 2018 to define postperiod—Placebo plot: Philadelphia versus nonprogressive cities. The graph shows Philadelphia in a red line and the nonprogressive cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide differential for each year calculated from the expected mean number of homicides. The vertical line at 2018 divides the pre-period and the post-period, defined here by when District Attorney Larry Krasner took office [Color figure can be viewed at wileyonlinelibrary.com]

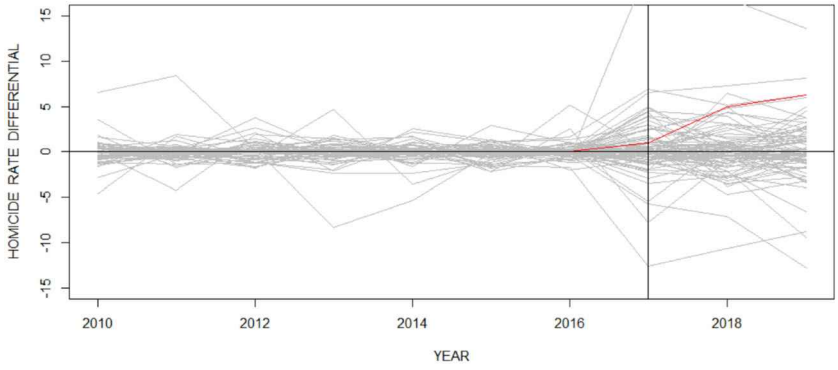

FIGURE A5 Using homicide rates instead of raw number of homicides—Placebo plot: Philadelphia versus nonprogressive cities. The graph shows Philadelphia in a red line and the nonprogressive cities from the donor pool in gray lines. The Philadelphia red line is "lost" in the preperiod because it is subsumed into the mean line, a likely overfitting issue. The *x*-axis is the year and the *y*-axis is the homicide rate differential for each year calculated from the expected mean homicide rate. The vertical line at 2017 divides the pre-period and the post-period, defined here by the election of District Attorney Larry Krasner [Color figure can be viewed at wileyonlinelibrary.com]

death penalty bans, de-criminalizing drugs, opposing mandatory minimum sentences, categorizing the criminal justice system as systemically racist and leading to mass incarceration, support for sanctuary cities, ending cash bail, and implicit bias training. The factors of no experience as a line state-court prosecutor and experience only as a defense/civil rights attorney spring from the fact that a line state-court prosecutor generally has been exposed to so much violent crime and the criminal justice system so as to be suspicious of radical changes to the system and/or subject to regulatory capture. The same reasoning applies to being in office as a district attorney for less than eight years; for those chief prosecutors in office going back to the 2000s or early 2010s, it would be

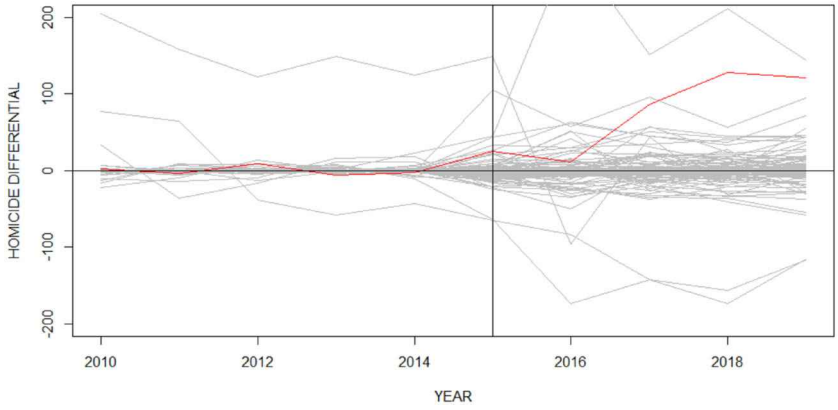

FIGURE A6 Placebo plot: Philadelphia versus all cities. The graph shows Philadelphia in a red line and all of the other cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide rate differential for each year calculated from the expected mean homicide rate. The vertical line at 2015 divides the pre-period and the post-period [Color figure can be viewed at wileyonlinelibrary.com]

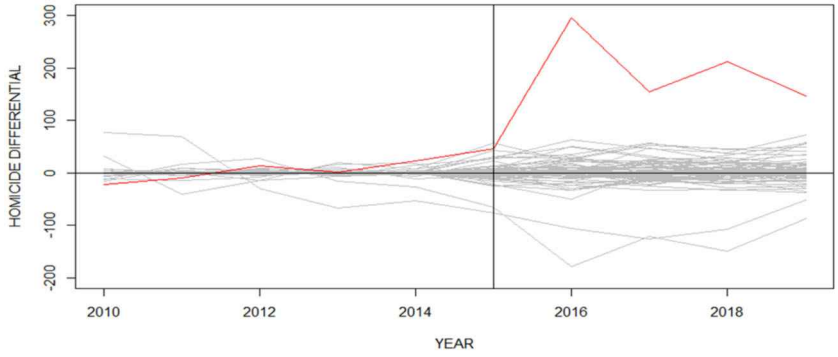

FIGURE A7 Placebo plot: Chicago versus nonprogressive cities. The graph shows Chicago in a red line and the nonprogressive cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide differential for each year calculated from the expected mean number of homicides. The vertical line at 2015 divides the pre-period and the post-period, defined here by the election of State's Attorney Kim Foxx [Color figure can be viewed at wileyonlinelibrary.com]

very difficult to break from a law-and-order approach. Soros funding may be facially controversial, but it is difficult to argue that it is not a perfect proxy for progressive prosecutors. I am unaware of any prosecutor funded by the Soros PACs who was not a validly progressive, de-prosecuting prosecutor. Finally, the location of the prosecutor in a heavily Democratic area reflects the political reality that it is much more viable to be a successful progressive candidate in a Democratic area than in a Republican area.

Traditional criteria (must have nine out of 13):

-self-identified as traditional or "law-and-order"
-no ban on death penalty
-active drug prosecutions highlighted
-links drugs to violent crime

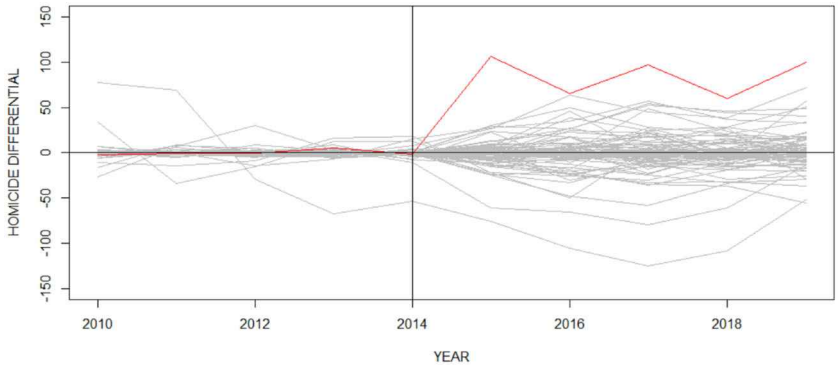

FIGURE A8 Placebo plot: Baltimore versus nonprogressive cities. The graph shows Baltimore in a red line and the nonprogressive cities from the donor pool in gray lines. The *x*-axis is the year and the *y*-axis is the homicide differential for each year calculated from the expected mean number of homicides. The vertical line at 2014 divides the pre-period and the post-period, defined here by the election of State's Attorney Marilyn Mosby [Color figure can be viewed at wileyonlinelibrary.com]

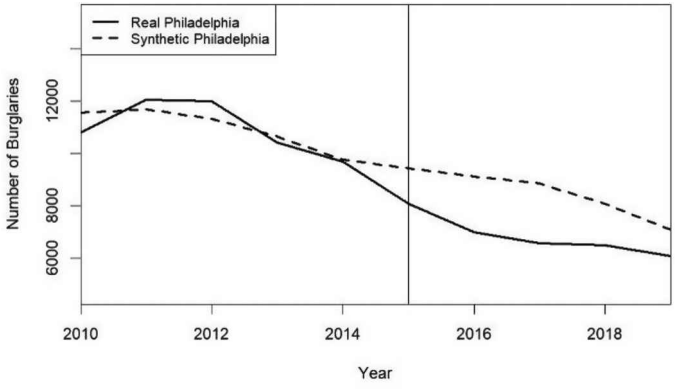

FIGURE A9 Burglary as dependent variable—Synthetic control plot: Philadelphia versus nonprogressive cities. The solid horizontal line shows burglaries by year in real Philadelphia. The dashed line shows burglaries by year in a counterfactual synthetic Philadelphia. The vertical line at 2015 divides the pre-period and the post-period

-line state court prosecutorial experience of at least five years
-lack of criminal defense experience
-not opposed to use of cash bail
-support for mandatory minimum sentences
-opposition to sanctuary cities
-endorsed by police unions
-formally opposed by or protested by progressive entities (e.g., ACLU/FJP/BLM)
-more than 10 years in office
-heavily Republican area

Discussion: The factors for qualifying as a traditional prosecutor act as a proxy for maintaining a steadily large number of prosecutions based on historical trends. These factors are mainly the obverse of the factors for progressive prosecutors. The factors of being endorsed by police unions and formally opposed by certain interest groups are simply potential markers for a "law-and-order" approach that includes a vigorous number of prosecutions and gauges the relationship between prosecutors and police. As an example, the current Miami-Dade County chief prosecutor

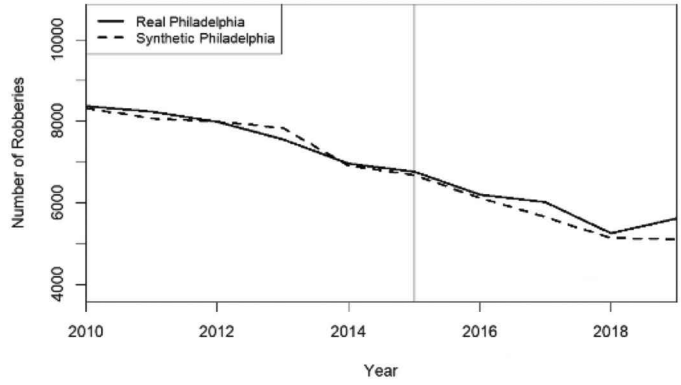

FIGURE A10 Robbery as dependent variable—Synthetic control plot: Philadelphia versus nonprogressive cities. The solid horizontal line shows robberies by year in real Philadelphia. The dashed line shows robberies by year in a counterfactual synthetic Philadelphia. The vertical line at 2015 divides the pre-period and the post-period

TABLE A1 Chief prosecutor category for 100 largest cities in the United States, aggregated for 2015–2019 time period

1. New York: Middle.
2. Los Angeles: Middle.
3. Chicago/Cook County: Progressive.
4. Houston/Harris County: Middle.
5. Phoenix/Maricopa County: Traditional.
6. Philadelphia: Progressive.
7. San Antonio/Bexar County: Middle.
8. San Diego: Middle.
9. Dallas: Middle.
10. San Jose: Middle.
11. Honolulu: Middle.
12. Austin: Middle.
13. Indianapolis: Middle.
14. Jacksonville: Middle.
15. San Francisco: Progressive.

(Continues)

has been in office since 1993, was a line prosecutor before assuming the office, has been protested by progressive entities, and qualifies as "traditional" via virtually every factor. Such a designation reflects the fact that she is unlikely to engage in a de-prosecution policy.

Middle criteria: not fully qualifying for either of above categories or in transition phase.

Discussion: Prosecutors in the middle category may reflect a robust mixture of both traditional and progressive factors or may simply not qualify with sufficient definitional factors. The middle category may be a function of elections, political change (the long-time Seattle chief prosecutor switched from being a traditional Republican to a progressive Democrat, while the Omaha district attorney switched from a moderate Democrat to a moderate Republican), advances in prosecutorial understanding of data, personal experience, or other factors. The recent historical arc of prosecutors in large cities across the United States is a movement from traditional to middle or progressive.

Final comment: The classification of prosecutors is worthy of an entirely separate article. The above-described taxonomy is an initial attempt to create a systematic classification of prosecutorial regimes based on data, common sense, political history, and experience.

TABLE A1 (Continued)

16. Columbus: Traditional.
17. Charlotte: Traditional.
18. Fort Worth: Traditional.
19. Detroit: Traditional.
20. El Paso: Traditional.
21. Memphis: Traditional.
22. Seattle: Progressive.
23. Denver: Progressive.
24. Boston: Progressive.
25. Nashville: Middle.
26. Baltimore: Progressive.
27. Oklahoma City: Traditional.
28. Louisville: Middle.
29. Portland/Multnomah County: Middle.
30. Las Vegas: Middle.
31. Milwaukee: Progressive.
32. Albuquerque: Progressive.
33. Tucson/Pima County: Middle.
34. Fresno: Traditional.
35. Sacramento: Traditional.
36. Long Beach, CA: Middle.
37. Kansas City, MO/Jackson County: Middle.
38. Mesa, AZ: Traditional.
39. Virginia Beach: Traditional.
40. Atlanta: Middle.
41. Colorado Springs: Traditional.
42. Omaha/Douglas County: Middle.
43. Raleigh: Middle.
44. Miami-Dade County: Traditional.
45. Oakland/Alameda County: Traditional.
46. Minneapolis/Hennepin County: Middle.
47. Tulsa: Traditional.
48. Cleveland: Middle.
49. Wichita: Traditional.
50. Arlington, TX/Tarrant County: Middle.
51. New Orleans: Traditional.
52. Bakersfield, CA: Middle.
53. Tampa: Progressive.
54. Aurora, CO: Traditional.
55. Anaheim, CA/Orange County: Traditional.
56. Santa Ana, CA/Orange County: Traditional.
57. St. Louis: Progressive.
58. Riverside, CA: Traditional.
59. Corpus Christi/Nueces County: Progressive.
60. Lexington, KY: Traditional.
61. Pittsburgh: Middle.
62. Anchorage: Appointed. Middle.
63. Stockton/San Joaquin County: Middle.
64. Cincinnati/Hamilton County: Traditional.

(Continues)

TABLE A1 (Continued)

65. St. Paul: Middle.
66. Toledo: Traditional.
67. Greensboro/Guilford County: Traditional.
68. Newark: Appointed. Middle.
69. Plano, TX/Collin County: Traditional.
70. Henderson, NV/Clark County: Middle.
71. Lincoln, Neb./Lancaster County: Traditional.
72. Buffalo/Erie County: Middle.
73. Jersey City: Appointed. Middle.
74. Chula Vista: Middle.
75. Fort Wayne/Allen County: Traditional.
76. Orlando: Progressive.
77. St. Petersburg: Traditional.
78. Chandler, AZ: Traditional.
79. Laredo, TX: Traditional.
80. Norfolk, VA: Progressive.
81. Durham: Progressive.
82. Madison: Progressive.
83. Lubbock, TX: Traditional.
84. Irvine, CA/Orange County: Traditional.
85. Winston-Salem: Traditional.
86. Glendale, AZ: Traditional.
87. Garland, TX: Middle.
88. Hialeah, FL: Traditional.
89. Reno, NV/Washoe County: Traditional.
90. Chesapeake, VA: Traditional.
91. Gilbert, AZ: Traditional.
92. Baton Rouge: Traditional.
93. Irving, TX: Middle.
94. Scottsdale: Traditional.
95. North Las Vegas: Middle.
96. Fremont, CA/Alameda County: Traditional.
97. Boise: Traditional.
98. San Bernardino, CA: Middle.
99. Birmingham: Progressive.
100. Richmond, VA: Middle.

Note: Overall study excludes 2020–2021 because of certain data limitations and potentially aberrational impact on homicides of pandemic and George Floyd protests. Some cities covered by same district attorney, resulting in same classification. Where chief prosecutor is appointed rather than elected, category is assigned based on policies of supervising authority (usually attorney general or governor).

Source: Official office web sites, campaign sites, funding reports, candidate questionnaires, personal and office social media, publicly available statements to media, and statistical dashboards (where available).

TABLE A2 Chief prosecutor category for 100 largest cities in the United States, showing change from 2010 to 2021

	2010	2021
1. New York	Traditional	Middle
2. Los Angeles	Middle	Progressive
3. Chicago/Cook County	Traditional	Progressive
4. Houston/Harris County	Traditional	Middle
5. Phoenix/Maricopa County	Traditional	Traditional
6. Philadelphia	Middle	Progressive
7. San Antonio/Bexar County	Traditional	Progressive
8. San Diego	Traditional	Middle
9. Dallas	Traditional	Middle
10. San Jose	Traditional	Middle
11. Honolulu	Traditional	Middle
12. Austin	Traditional	Progressive
13. Indianapolis	Traditional	Middle
14. Jacksonville	Traditional	Middle
15. San Francisco	Progressive	Progressive
16. Columbus	Traditional	Progressive
17. Charlotte	Traditional	Traditional
18. Fort Worth	Traditional	Traditional
19. Detroit	Traditional	Traditional
20. El Paso	Traditional	Traditional
21. Memphis	Traditional	Traditional
22. Seattle	Traditional	Progressive
23. Denver	Middle	Progressive
24. Boston	Traditional	Progressive
25. Nashville	Traditional	Middle
26. Baltimore	Traditional	Progressive
27. Oklahoma City	Traditional	Traditional
28. Louisville	Traditional	Middle
29. Portland/Multnomah County	Middle.	Traditional
30. Las Vegas	Middle.	Middle
31. Milwaukee	Middle	Middle
32. Albuquerque	Traditional	Progressive
33. Tucson/Pima County	Middle	Progressive
34. Fresno	Traditional	Traditional
35. Sacramento	Traditional	Traditional
36. Long Beach, CA	Traditional	Middle
37. Kansas City, MO/Jackson County	Traditional	Middle
38. Mesa, AZ	Traditional	Traditional
39. Virginia Beach	Traditional	Traditional
40. Atlanta	Traditional	Middle

(Continues)

TABLE A2 (Continued)

	2010	2021
41. Colorado Springs	Traditional	Traditional
42. Omaha/Douglas County	Traditional	Middle
43. Raleigh-Durham	Traditional	Middle
44. Miami-Dade County	Traditional	Traditional
45. Oakland/Alameda County	Traditional	Traditional
46. Minneapolis/Hennepin County	Traditional	Middle
47. Tulsa	Traditional	Traditional
48. Cleveland	Middle	Middle
49. Wichita	Traditional	Traditional
50. Arlington, TX/Tarrant County	Traditional	Middle
51. New Orleans	Traditional	Progressive
52. Bakersfield, CA	Middle	Traditional
53. Tampa	Middle	Progressive
54. Aurora, CO	Traditional	Traditional
55. Anaheim, CA/Orange County	Middle	Middle
56. Santa Ana, CA/Orange County	Middle	Middle
57. St. Louis	Traditional	Progressive
58. Riverside, CA	Traditional	Traditional
59. Corpus Christi/Nueces County	Traditional	Progressive
60. Lexington, KY	Traditional	Traditional
61. Pittsburgh	Traditional	Middle
62. Anchorage	Middle	Middle
63. Stockton/San Joaquin County	Traditional	Progressive
64. Cincinnati/Hamilton County	Traditional	Traditional
65. St. Paul	Traditional	Middle
66. Toledo	Traditional	Traditional
67. Greensboro/Guilford County	Traditional	Progressive
68. Newark	Middle	Middle
69. Plano, TX/Collin County	Traditional	Traditional
70. Henderson, NV/Clark County	Traditional	Traditional
71. Lincoln, Neb./Lancaster County	Traditional	Traditional
72. Buffalo/Erie County	Traditional	Middle
73. Jersey City	Middle	Middle
74. Chula Vista	Traditional	Traditional
75. Fort Wayne/Allen County	Traditional	Traditional
76. Orlando	Traditional	Progressive
77. St. Petersburg	Traditional	Traditional
78. Chandler, AZ	Traditional	Traditional
79. Laredo, TX	Traditional	Traditional
80. Norfolk, VA	Traditional	Progressive
81. Durham	Traditional	Progressive

(Continues)

TABLE A2 (Continued)

	2010	2021
82. Madison	Middle	Progressive
83. Lubbock, TX	Traditional	Traditional
84. Irvine, CA	Traditional	Middle
85. Winston-Salem	Traditional	Traditional
86. Glendale, AZ	Traditional	Traditional
87. Garland, TX	Traditional	Middle
88. Hialeah, FL	Traditional	Traditional
89. Reno, NV/Washoe County	Traditional	Traditional
90. Chesapeake, VA	Traditional	Traditional
91. Gilbert, AZ	Traditional	Traditional
92. Baton Rouge	Traditional	Traditional
93. Irving, TX	Traditional	Middle
94. Scottsdale	Traditional	Traditional
95. North Las Vegas	Middle	Middle
96. Fremont, CA/Alameda County	Middle	Middle
97. Boise	Traditional	Traditional
98. San Bernardino, CA	Middle	Middle
99. Birmingham	Traditional	Progressive
100. Richmond, VA	Traditional	Middle

TABLE A3 Sentencings for other crimes in Philadelphia (2010–2019)

Year	Rape	Robbery	Burglary (residential)	DUI*	Retail theft
2010	50	827	519	144	258
2011	40	773	308	109	163
2012	45	1071	682	206	323
2013	37	1117	501	192	271
2014	59	972	523	191	370
2015	33	656	314	236	164
2016	63	747	423	242	316
2017	49	668	261	198	195
2018	47	534	155	144	55
2019	50	290	134	47	15

Source: Pennsylvania Sentencing Commission.

*"DUI" refers to the offense of driving under the influence of alcohol or a controlled substance.

TABLE A4 Historical statistics for Philadelphia (expanded version for crimes)

Year	New prosecutions	Sentencings	Drug felonies	Drug misdemeanors	VUFA felonies	Rape	Robbery	Burglary	DUI*	Retail theft	Population	Median income	Homicides
2010	16,000	6230	2498	508	719	50	827	519	144	258	1,528,283	34,667	306
2011	14,702	5147	2427	341	473	40	773	308	109	163	1,540,466	34,433	326
2012	15,334	7308	2714	448	791	45	1071	682	206	323	1,551,824	35,518	331
2013	15,743	6953	2621	381	854	37	1117	501	192	271	1,558,313	36,918	246
2014	14,401	7252	2946	493	937	59	972	523	191	370	1,565,460	39,037	248
2015	13,140	4688	1939	436	949	33	656	314	236	164	1,571,065	41,210	280
2016	11,789	5986	2269	762	963	63	747	423	242	316	1,576,051	41,514	277
2017	11,034	4423	1395	611	878	49	668	261	198	195	1,580,601	40,193	315
2018	9036	3609	1042	483	683	47	534	155	144	55	1,583,592	46,149	353
2019	9514	2195	800	280	440	50	290	134	47	15	1,584,064	47,598	356

*"DUI" refers to the offense of driving under the influence of alcohol or a controlled substance.

TABLE A5 Year-over-year changes in weapons offenses in Philadelphia

Year	Weapons offenses
2010	1631
2011	1625
2012	1490
2013	1406
2014	1425
2015	1324
2016	1899
2017	2111
2018	2195
2019	2560

Source: OpenDataPhilly.Org.