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Crime and Inflation in U. S. Cities[1]

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Crime and Inflation in US Cities

Abstract

Objectives

The current study replicates prior national-level research on the relationship between crimes committed for monetary gain and inflation in a sample of 17 U. S. cities between 1960 and 2013.

Methods

A random coefficients model is used to estimate the effects of inflation on the change in acquisitive crime over time, controlling for other influences.

Results

The estimates yield significant effects of inflation on acquisitive crime rates in the 17 cities. City-specific coefficients reveal nontrivial variation across the cities in the significance, size, and impact of inflation on acquisitive crime.

Conclusions

Continued low inflation rates should restrain future crime increases in many US cities. U. S. monetary policy should be evaluated with respect to its effect on crime.

Recent studies have found that the change in consumer prices over time is a robust predictor of crimes committed for monetary gain in the United States (Nunley, Stern, Seals, and Zietz 2016; Rosenfeld and Levin 2016). Over the past half century, increases in acquisitive crime have coincided with rising prices and decreases in acquisitive crime have coincided with slowed inflation. It appears that inflation is an important part of the story of acquisitive crime trends during the contemporary era, not only in the United States but in other nations as well (Rosenfeld 2014).

But the story of crime and inflation is far from finished. Nearly all of the research on crime and inflation, including the Nunley et al. (2016) and Rosenfeld and Levin (2016) studies, has been conducted at the national level. It remains unclear whether similar results hold for subnational units, such as cities, that differ in both prices and crime rates. This paper reports the results of a study that addresses this unresolved research issue. We estimate the effects of inflation on annual rates of acquisitive crime in 17 US cities for which both inflation and crime data were available between 1960 and 2013. Our model yields estimates of inflation effects on city crime rates, controlling for income, unemployment, police strength, and other conditions associated with macro-level crime rates. We find significant inflation effects on crimes committed for monetary gain for the sample as a whole, but the significance and size of the effects differ across the cities.

BACKGROUND

Several prior studies have reported a significant relationship between inflation and crime rates in the United States (e.g., Allen 1996; Cohen and Felson 1979; LaFree and

Drass 1996; Ralston 1999). As Rosenfeld and Levin (2016) point out, however, past research lacks a compelling rationale for why the effect of inflation on crime rates should differ from that of other economic indicators, such as unemployment or economic growth. Rosenfeld and Levin contend that inflation increases robbery, burglary, and other crimes committed for monetary gain by bolstering consumer demand for cheap stolen goods. As prices rise, stolen goods become more attractive to consumers in comparison with the same goods sold by legitimate retailers, including bargain outlets such as the thrift stores operated by the Salvation Army and Goodwill Industries. Increased demand, in turn, strengthens incentives for the robbers, burglars, and thieves who supply underground markets with stolen merchandise. As a result, acquisitive crime rates increase. By the same logic, lower inflation diminishes the attraction of stolen goods to consumers and criminals alike, and acquisitive crime rates decline (Rosenfeld and Levin 2016:431-432). Nunley et al. (2016) posit a somewhat similar economic theory connecting acquisitive crime rates to inflation.

SUBNATIONAL EFFECTS OF INFLATION

Rosenfeld and Levin (2016) acknowledge the absence of direct empirical evidence for their theory of inflation effects on crime, owing to the paucity of data on the price of stolen goods over time. But even if the requisite evidence were available, previous studies of the impact of inflation on crime have been based almost exclusively on nation states as units of analysis.[2] That leaves open the question of whether the criminogenic effects of inflation are similar across subnational units such as cities. It

[2] An exception is a city-level study of crime and economic conditions by Baumer, Rosenfeld, and Wolff (2013). In that study, however, inflation is measured at the level of US Census regions.

would be an obvious error, akin to the ecological fallacy, to assume that results from national-level analysis necessarily hold at the local level. Most macro-level etiological theories of crime assume that substantively meaningful variation exists among subnational units in crime and its covariates. Indeed, subnational variation is the basis on which these theories are commonly tested (e.g., Peterson and Krivo 2010). Crime policy is also set and evaluated primarily at the state and local level in the United States. In short, for both theoretical and policy purposes, it would be a mistake to assume that results obtained from national-level data on crime and inflation ipso facto are replicated at the local level.

It is well known that both crime and commodity prices differ substantially across U. S. cities. The robbery rate in Houston, for example, is nearly twice that in Seattle.[3] A pair of boy's jeans costs $17.45 in Cincinnati and $22.07 in Chicago. An apartment in Cincinnati rents for $856 on average and $1,236 in Chicago.[4] These large between-city differences in crime and prices might prompt skepticism about whether the relationship between crime and inflation observed at the national level also exists at the local level. But between-city differences in crime and price *levels* need not correspond with within-city *changes* in crime rates and prices -- inflation -- the issue of primary concern in the current study. In fact, it appears that city crime trends have converged on a common national trend over the past several decades in the United States (McDowall and Loftin 2009). The same is true for city inflation trends (Cecchetti, Mark, and Sonora 2002; Clark 1984).

[3] The robbery data are from the 2012 Uniform Crime Reports (https://www.bjs.gov/ucrdata/)
[4] The price comparisons, which should be viewed as rough approximations, are from Bankrate (http://www.bankrate.com/calculators/savings/moving-cost-of-living-calculator.aspx).

Even if the national and local trends are similar, however, the relationship between crime and inflation trends may differ across cities. For one thing, despite their general similarities, some variation does exist in city crime and inflation trends.[5] Cities also differ in other respects, for example in income levels and police strength, that may affect crime rates, inflation, or both. Cities may also differ in the significance and size of the effects of inflation on crime rates. Finally, even if the relationship between crime and inflation observed at the national level is found to hold at the city level, it is unlikely to exist in all cities, and the deviant cases may contain important information about the dynamics of the relationship unavailable from either national-level or pooled city analyses. For all of these reasons, the national-level research leaves an important part of the crime and inflation story untold. The study of individual cities can help to fill in some of the remaining research gaps.

CURRENT STUDY

This study analyzes the relationship between acquisitive crime rates and inflation in 17 U. S. cities between 1960 and 2013. Based on the forgoing discussion, we hypothesize that inflation has a significant and positive effect on city-level acquisitive crime rates. We evaluate this hypothesis in a random coefficients panel model that yields estimates of inflation effects on city acquisitive crime rates cities over the 54-year observation period. The model produces individual regression coefficients for each of the 17 cities, which indicate the range of variation across the cities in inflation effects on acquisitive crime. In addition to inflation, our models include measures of income,

[5] Cecchetti, Mark, and Sonora (2002) report, for example, that although city inflation trends converge to a common mean, convergence may take several years to occur. To our knowledge, a similar assessment has not been conducted for city crime rate trends.

socioeconomic disadvantage, police per capita, and age composition. The specification of our city-level models is similar to the national-level models in Rosenfeld and Levin (2016).

DATA AND METHODS

The outcome in our analyses is the acquisitive crime rate per 100,000 population for 17 US cities between 1960 and 2013. The measure of acquisitive crime consists of the combined rates of robbery, burglary, larceny, and motor vehicle theft. The crime data are crimes known to the police from the FBI's Uniform Crime Reporting program (https://ucr.fbi.gov).[6]

The independent variable of primary interest is the inflation rate for the metropolitan areas of the 17 cities (see Appendix). Inflation is defined as the year-over-year percentage change in the Consumer Price Index (CPI). The CPI is based on the price paid by urban consumers for a representative market basket of goods and services, with 1982-1984 average city prices assigned the value of 100 (https://www.bls.gov/cpi). The current study is based on 17 cities for which annual inflation data were available from the Bureau of Labor Statistics between 1960 and 2013. The inflation data are for the metropolitan areas in which the 17 cities are situated; all other data are for the 17 central cities.

In order to distinguish the effects of inflation on acquisitive crime rates from those of other economic and social conditions, several additional socioeconomic and demographic indicators are included in our analyses. Median family income, measured

[6] We thank Roland Chilton for sharing crime data for this analysis.

in nominal dollars,[7] is from the 1960-2010 decennial censuses and is interpolated between census years. Data for 2011-2013 are from the American Community Survey (ACS) (https://www.census.gov/programs-surveys/acs/). The annual civilian unemployment rate is from the Current Population Survey (CPS) (http://www.census.gov/programs-surveys/cps.html). The poverty rate, the unemployment rate, the percentage of families with children under the age of 18 headed by females, and the percentage of the population that is black or African-American are highly correlated (α = .74) and have been combined by factor analysis into a single measure of socioeconomic disadvantage.[8] The measures of poverty, female-headed families, and racial composition are from the decennial censuses and ACS. The analyses also include, from the CPS, the percentage of the city population between the ages of 15 and 24. Finally, the number of police officers per 10,000 population, from the FBI's Uniform Crime Reports, is included in the analyses as a measure of deterrence.

These substantive indicators represent many of the major economic and social conditions shown in prior research to be associated with city crime rates (Land, McCall, and Cohen 1990; McCall, Land, and Parker 2010). In addition, we include a measure of time in our models to capture the effects of unmeasured time-varying conditions common to the 17 cities. The measure consists of 11 five-year intervals from 1960-1964, 1965-1970 . . . 2010-2013 (the final interval contains four years). The effects of inflation and

[7] We measure income in nominal dollars because the inflation rate controls for price changes.
[8] The factor scores are based on an orthogonal rotated solution. A single factor combining the four measures (eigenvalue = 2.82) was retained that explains 99% of the variance. The rotated and unrotated solutions are very similar.

the control variables could not be reliably estimated with single year or shorter intervals in the panel model used in the study.[9]

ANALYTIC STRATEGY

We estimate the effect of inflation on acquisitive crime in a random coefficients linear panel model that yields an effect for the sample as a whole and separate effects for each of the 17 cities. We have selected this estimator precisely because it models panel variation in the effects of independent variables on the outcome, a key research objective. The specific model we use is from Swamy (1970), implemented in the xtrc routine in Stata 13.1 (see Poi 2003). The model assumes that the parameter estimates, both intercepts and slopes, are drawn from a random distribution common to the panels. Given this assumption, the model produces unbiased and efficient estimates of the outcome for the sample and for each of the panels. A chi-square test of the significance of the difference in the regression coefficients across the panels (termed "parameter constancy") is also provided.

Multiple explanatory variables can be included in the equation, and lags of the outcome can be added to the righthand side to address serial correlation in the error term. Inspection of the pooled data indicated serial correlation (rho = .970, DW = .186). We therefore added the first lag of the acquisitive crime rate to the explanatory variables. The lagged outcome eliminated first-order serial correlation in the error term (rho = .059, DW = 1.984). The inclusion of the lagged outcome reduced the number of observations

[9] With single year effects included, the model would not produce estimates of the effects of the explanatory variables based on the pooled data. Time intervals shorter than five years yielded missing estimates in the city-specific results. The likely reason is that these time intervals absorbed degrees of freedom required to estimate the pooled and city-specific coefficients. The chi-square test of parameter constancy, for example, is computed on 288 degrees of freedom (see Table 2).

from 918 (54 years x 17 cities) to 901. Finally, with the lagged outcome on the righthand side, the model estimates the residual change in the acquisitive crime rate -- the effect of the explanatory variables on the change in the acquisitive crime rate from the prior year to the current year.[10]

RESULTS

We first present descriptive statistics for each of the covariates, followed by a graphic presentation of the acquisitive crime and inflation time series for the 17 cities. The descriptive statistics include the pooled mean, the standard deviation, minimum, and maximum values for each variable between cities and within cities over time (see Table 1). The mean acquisitive crime rate for the sample is approximately 7141 crimes per 100,000 city population. Somewhat more of the variation in acquisitive crime occurs within than between the 17 cities. The mean inflation rate is just below 4%, and nearly all of the variation in inflation occurs within the cities over time, from a minimum inflation rate of approximately -2.5% to a maximum of approximately 16.4%. The within-city variation in median family income is also far larger than the variation between the cities. The sample variation in the socioeconomic disadvantage factor is roughly similar between and within cities. The same is true for city age composition. Finally, the number of police officers per 10,000 city residents varies more between than within cities.

Table 1 about here

[10] Lagged dependent variables are controversial. Many analysts discourage their use because they can induce downward bias in the coefficients on the explanatory variables (e.g., Allison 2015). In the present case, however, including the lagged acquisitive crime rate in the model slightly increases the coefficient on inflation. The coefficients on the other explanatory variables are non-significant regardless of whether the lagged outcome is included (see Table 2).

The between- and within-city variation in the crime measure and the inflation rate are graphically displayed in Figures 1 and 2. Figure 1 shows the acquisitive crime time series between 1960 and 2013. We observe notable differences across the cities in levels of acquisitive crime over the entire period. Despite the differences in acquisitive crime levels, however, the cities exhibit similar change in acquisitive crime over time. Acquisitive crime rates in the 17 cities generally rose from the 1960s to a peak in 1980, fell for a few years and then increased to a second peak in the early 1990s, and fell thereafter, a temporal pattern that corresponds with annual change in the national acquisitive crime rate during the 54-year period. Acquisitive crime rates are higher on average in the 17 cities than the nation as a whole. The average city-level and national trends are nearly identical, however (r = .982). As shown in prior research, city crime trends appear to be offshoots of a common national trend (McDowall and Loftin 2009).

Figure 1 about here

There is little question that the inflation rates of the 17 cities follow a national trend. As shown in Figure 2, the metro area inflation rates bunch tightly around the national inflation rate. The correlation between the average inflation rate for the 17 cities and the national inflation rate is .970. Inflation rose from the mid-1960s to peaks in the mid-1970s and in 1980. After cresting again in 1990 at just over 5%, inflation rates hovered between 2% and 4% until the Great Recession; in 2009 the CPI fell for the first time in nearly 60 years. The national acquisitive crime rate was associated with the ebb and flow of inflation during this period, rising with increases and falling with decreases in inflation (Nunley et al. 2016; Rosenfeld and Levin 2016). We now consider whether

acquisitive crime and inflation rates are associated at the city level and whether this relationship withstands controls for other economic and social conditions.

Figure 2 about here

PANEL MODEL RESULTS

Table 2 presents the estimates for the residual change in city acquisitive crime rates from the random coefficients panel regression. In Model 1 of the table, the lagged acquisitive crime rate and the inflation rate have significant effects on change in the acquisitive crime rate. None of the coefficients on the other variables in the model is statistically significant at the 5% level. Table 2 displays both the unstandardized regression coefficients (b) and the standardized coefficients (β). In Model 1, a one unit increase in inflation produces approximately 96 additional acquisitive crimes per 100,000 population. A one standard deviation increase in inflation is associated with a .099 standard deviation increase in the contemporaneous acquisitive crime rate (approximately 283 acquisitive crimes per 100,000 population).[11]

Table 2 about here

These appear to be small effects, but because the estimates are conditioned on the lagged acquisitive crime rate they reflect the predicted *change* in acquisitive crime from one year to the next. The substantive import of inflation was especially pronounced during the first half of the observation period, when acquisitive crime was increasing rapidly. The acquisitive crime rate rose by .086 units of standard deviation per year between 1960 and 1985. All of this observed change in acquisitive crime was accounted

[11] With the lagged outcome omitted from the model, the unstandardized and standardized coefficients on inflation are 78.0 and .080, respectively ($p < .05$). The other explanatory variables remain non-significant (see fn9).

for by the .099 standardized effect of inflation. (The combined effect of the other variables produced a small decrease in acquisitive crime.)

Evaluating the effect of inflation on acquisitive crime should take account of the level of income over time and across cities. If income keeps pace with or exceeds inflation, we should expect the criminogenic effect of inflation to diminish. For that reason, we have included income in our regression model. But income should not only have an additive effect, it should condition the effect of inflation on acquisitive crime. Based on the logic model underlying the analysis, the effect of inflation on acquisitive crime should be stronger in less affluent, more disadvantaged cities where consumers may be especially likely to search for cheap stolen goods when prices rise. To evaluate this hypothesis, we included interaction terms in the model for inflation x income and inflation x socioeconomic disadvantage.

We found no evidence that the measure of socioeconomic disadvantage conditions the effect of inflation on the change in acquisitive crime rates. The interaction term including socioeconomic disadvantage is non-significant in estimations with and without the term including income (results not shown).[12] By contrast, the inflation x income interaction term is statistically significant and, as hypothesized, negative ($b = -3.571$, $p < .05$). Inflation has a smaller effect on acquisitive crime in cities where the median family income is comparatively high than in less affluent cities.

We inspected the random coefficients models for multicollinearity and nonlinearity. The variance inflation factors for the regressors show no evidence of

[12] All results not shown are available from the first author by request.

multicollinearity.[13] The model assumes that the outcome is a linear function of the predictors. We checked this assumption for the relationship between the change in the city crime rates and inflation by estimating a quadratic specification of the panel models incorporating the square of inflation. In results not shown, we found no evidence of a nonlinear relationship between the acquisitive crime rate and inflation.

CITY-SPECIFIC RESULTS

We have characterized the panel regression results as indicating the effect of inflation on the change in the city acquisitive crime rate. In fact, however, the results pertain to the effects of inflation on the change in acquisitive crime in 17 individual cities. On average, the effect of inflation is positive and significant, but the variability in those effects could be quite large, and in some cities inflation may have no significant effect on the change in acquisitive crime. It is therefore informative to inspect the effects of inflation on the change in acquisitive crime rates in each of the cities.

The random coefficients model returns a separate slope coefficient for each of the 17 cities in the sample. The chi-square test of parameter constancy indicates that the slope coefficients vary significantly across the cities (see Table 2). To determine whether the variance in the coefficients is attributable to inflation and not simply the other explanatory variables or the period effects, we re-estimated the model retaining only the

[13] In Model 1, the mean VIF = 1.43 and the max VIF = 1.74. The comparable values in Model 2 are increased by the interaction term, but remain within an acceptable range (mean VIF = 3.28, max VIF = 6.62).

lagged acquisitive crime rate and inflation on the right-hand side. The test for parameter constancy remained significant ($\chi^2 = 93.6$, $p = .0001$).[14]

Figure 3 graphically summarizes the variance in the coefficients. To compare the effect sizes across the cities, the standardized coefficients (β) are shown. The standardized inflation effects vary from zero (Portland) to .184 (New York). In addition to New York, four cities cluster at the top of the display, with coefficients $\geq$ .168 (Kansas City, Boston, St. Louis, Atlanta). In the remainder of the cities where the inflation effects are statistically significant, the standardized effects range from .125 to .062. Finally, in five of the 17 cities the effect of inflation on the change in acquisitive crime is not significant (Houston, San Francisco, Los Angeles, Chicago, and Portland).

Figure 3 about here

The variance in inflation effects across the cities is not simply a consequence of the presence in the sample of the five cities where inflation has no significant effect on acquisitive crime. With those cases omitted, the test for parameter constancy remains significant in models with and without the other explanatory variables and period effects (results not shown).

The variance across the cities in inflation effects on acquisitive crime is both statistically significant and, in certain cases, of substantive significance as well. Consider the difference in the effects of inflation on the acquisitive crime rate in Cincinnati and New York, the cities with the smallest and largest inflation effects that are statistically significant. Figure 4 displays the predicted effect of inflation on the acquisitive crime rate in Cincinnati and New York, with the other explanatory variables set to their mean

[14] The variance in the estimated effects is not due to the lagged acquisitive crime rate. With only the lagged crime rate in the model, the parameter constancy $\chi^2 = 30.7$, $p = .531$.

values. At the sample minimum and maximum inflation rates (-2% and 16%), the predicted acquisitive crime rate in New York varies from 4,228 to 7,335 per 100,000 population, a difference of 73.5%. The comparable difference in Cincinnati is from 4,789 to 5,773 acquisitive crimes per 100,000 population, a difference of just 16.8%.

Figure 4 about here

The greater impact of inflation on acquisitive crime in New York than in Cincinnati is evident when the impact is evaluated at the extreme bounds of inflation during the 54-year observation period. But a marked difference between the two cities in the impact of inflation also exists when evaluated within a more modest range. Figure 4 displays the predicted inflation rates in Cincinnati and New York between minus one and one standard deviation from the sample mean, or inflation rates of approximately one and seven percent. Within this range, New York's predicted acquisitive crime rate varies from 4,789 to 5,773 per 100,000 population, a difference of 20.6%. By contrast, the acquisitive crime rate in Cincinnati varies from 6,373 to 6,545 per 100,000 population, a difference of just 2.70%.

These results pertain to the two cities in the sample with the greatest variance in significant inflation effects on acquisitive crime; other comparisons would have yielded smaller differences in impact. Nonetheless, there is considerable variability in the impact of inflation on the change in acquisitive crime, even in those cities where the inflation effects are statistically significant. Differences of the magnitude shown in Figure 4 probably would attract the notice of crime control analysts and policymakers and, were they to develop an interest in crime, financial economists. We emphasize that these results serve only to illustrate the differing impacts of inflation on the change in

acquisitive crime. But we believe such individual case comparisons, where feasible, add informative context to the results of pooled analyses that distill the effects of explanatory variables into a single point estimate.

Where Inflation Has No Effect

Inflation has no statistically significant effect on acquisitive crime in Houston, San Francisco, Los Angeles, Chicago, and Portland. These non-significant effects are not simply a function of large standard errors of the estimates; the estimates themselves are comparatively small, as shown in Figure 3. It is not immediately obvious what demographic or socioeconomic characteristics the five cities share in common that might explain the null effects of inflation. We compared the cities with null inflation effects to those where the effects on acquisitive crime are significant with respect to each of the explanatory variables. The results are presented in Table 3.

Table 3 about here

Table 3 displays logistic regression coefficients and odds ratios for the difference in inflation, income, socioeconomic disadvantage, age composition, and police strength between cities with and without significant inflation effects on acquisitive crime (assigned the values of zero and one, respectively). The cities differ significantly on each of the explanatory variables, except for the rate of inflation ($p = .058$). Cities where inflation is not significantly associated with acquisitive crime tend to be more affluent and less disadvantaged. They also have smaller youth cohorts and somewhat fewer police per capita. As noted above, less disadvantaged cities with higher median incomes are places where we might expect inflation effects on acquisitive crime to be muted.

Even among the 12 cities with significant inflation effects on acquisitive crime, we found that the effects are weaker in locales with higher median incomes (results not shown).

This assessment represents only a small step toward specifying the conditions under which the effects of inflation on acquisitive crime may vary in magnitude and significance. But the city-specific analyses do disclose the increments to knowledge to be gained from moving beyond standard panel analyses that distill the causes and consequences of social phenomena into a single pooled estimate.

DISCUSSION

Prior studies of the influence of inflation on US crime rates have been conducted at the national level. Those studies have consistently found that inflation has a statistically significant and positive effect on crimes committed for monetary gain. National acquisitive crime rates rise with increases in inflation over time and fall with decreases in inflation. Prior research, however, leaves unanswered whether a similar relationship between inflation and acquisitive crime rates exists at the city level, arguably a more relevant unit of analysis for both criminological research and crime control policy. The current study replicates at the city level prior national-level research on the relationship between crimes committed for monetary gain and inflation in the United States.

Inflation trends over the past half century are remarkably similar across our sample of 17 cities for which the requisite data on both inflation and crime were available. The city-level trends also correspond closely to the national inflation trend. Nonetheless, cities may differ with respect to the effect of inflation on local crime rates.

We therefore analyzed the relationship between inflation and acquisitive crime with random coefficient models that yield separate regression estimates for each of the 17 cities.

In an analysis that pools the city-level data, we found a significant association between inflation and the residual change in city acquisitive crime rates between 1960 and 2013 that withstands controls for other influences on the change in acquisitive crime. The pooled results show that inflation increases acquisitive crime rates, particularly in less affluent cities. These results support the hypothesis that price increases prompt consumers to search for cheaper goods. Stolen goods cost less than those available from legitimate sources and should be especially attractive to consumers in areas where average incomes fail to keep pace with inflation.

These results are based on panel regressions that pool into a single value the effects of inflation on the change in acquisitive crime in the 17 cities. The pooled regression results are generally confirmed by separate estimates for each of the 17 cities. We also discovered, however, considerable variability across the cities in the significance and size of the inflation effects. In five of the cities, we found no significant effect of inflation on acquisitive crime. The null effect of inflation and the modest significant effect in many cities may result, we have suggested, from higher average incomes that reduce the demand for cheap stolen goods. In addition, both supply and demand may vary according to other characteristics of underground markets, including police effectiveness in stemming acquisitive crimes and the interpenetration of local drug markets and the market for stolen goods. The former would increase the risks associated with trafficking in stolen goods, while the latter could increase demand apart from

changes in consumer prices. These and other sources of local variation in the dynamics of underground markets deserve attention in future research.

The city-specific estimates reveal nontrivial variation in some of the inflation effects that are statistically significant. These are not "deviant" cases as usually understood. They are part of the normal covariation of crime and inflation across cities in the United States. The information they contain about the spatial dynamics of the relationship between crime and inflation would be lost if the relationship were examined merely by means of standard pooled cross-section time-series methods. An important, though by no means original, takeaway from this study is to learn how a model fits each panel unit whenever feasible in cross-section time-series analyses. That way, the investigator also learns how each unit influences the pooled results.

Several caveats about our analyses and results are in order. The 17 cities in the study are not necessarily representative of all large US cities. Caution should be exercised, therefore, in generalizing the results beyond the sample. Further, the variability in inflation effects found in the city-specific estimates should be viewed as merely illustrative of city differences in the significance, size, and impact of inflation on acquisitive crime. Finally, although we assume that the causal direction in the relationship between crime and inflation is from inflation to crime, some feedback is certainly possible such as, for example, when retailers raise prices in response to shoplifting.[15] National level research, however, has shown that the causal direction of the relationship between crime and inflation is from inflation to crime (Rosenfeld and Levin 2016; Tang and Lean 2007). Within the confines of the current sample we conclude that

[15] We thank Eric Baumer for this insight.

inflation has a significant influence on the change over time in acquisitive crime rates in many, perhaps most, U. S. cities.

In addition to extending the current analysis to a larger number of cities, which will depend on whether the Bureau of Labor Statistics increases the number of metropolitan areas for which it tracks inflation rates over time, future research should investigate the relationship between inflation and violent crime. Prior research has disclosed inflation effects on the homicide rates of several European nations and the United States (Rosenfeld 2014). There are good criminological reasons for assuming that inflation has both direct and indirect effects on violent crime. Studies have shown that violent crime rates are connected to changes in institutional legitimacy and other sources of social stress that have accompanied the rise and fall of inflation over time (Fischer 1996; LaFree 1998). In addition, inflation may influence violent crime through its effect on acquisitive crime. Disputes that arise among buyers and sellers in illegal markets cannot be settled by recourse to the police, courts, or other formal regulatory agencies (Vankatesh 2006). In such "stateless" social locations, violence becomes a potent enforcement mechanism (Black 1983). Burglars and thieves are also vulnerable targets for street robbers. Even if only a small fraction of acquisitive crimes end in violence, expansion in the market for stolen goods driven by increases in acquisitive crime can produce appreciable increases in violent crime (see Rosenfeld 2009).

U. S. cities have experienced a steep drop in street crime rates since the latter part of the twentieth century (Blumstein and Wallman 2006; Zimring 2007). Inflation rates have been running at or near historic lows for several years, at times well below the US

Federal Reserve Board's goal of 2%.[16] The crime drop has been particularly pronounced in New York, where homicide rates have returned to the levels of the 1950s (Southall 2017). Many analysts attribute New York's exceptional crime reductions to effective policing (e.g., Zimring 2007). Without discounting the role of the police, inflation has also likely played a part in New York's crime decline. Recall that inflation has a greater effect on acquisitive crime in New York than in any other city in our sample, although a few other cities come close (see Figure 3). Falling rates of inflation merit a prominent place among the factors responsible for the historic drop in U. S. crime rates (Rosenfeld and Levin 2016).

Fischer (1996) has charted four "great waves" of price increases since the Middle Ages, the last of which occurred throughout the developed world during the final quarter of the twentieth century. Each wave of inflation was followed by an extended period of price stability and relatively low crime rates. Crime forecasts are always hazardous and prone to upset by exogenous shocks.[17] But low inflation rates, which appear to be at least partly responsible for the storied crime decline in many American cities, should continue to curb crime increases in the foreseeable future.

The change in consumer prices over time is driven by national and international forces -- including exogenous shocks in the supply of energy and long term expansion and contraction in the money supply (Nunley et al. 2016) -- over which individual cities have little control. Subnational settings are appropriate criminal justice policy units; monetary policy is a federal responsibility. But what are the broad policy objectives that

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[16] See https://www.federalreserve.gov/publications/annual-report/2015-monetary-policy-and-economic-developments.htm#xsubsection-14-c4f66975.

[17] For example, some economists expect inflation rates to increase if "trade wars" break out under the Trump Presidency (Zumbrun 2016). See, also, Rosenfeld (2016; Rosenfeld, Gaston, Spivak, and Irazola 2017) on unexpected homicide increases in American cities during 2015 and 2016.

should guide the quest for the optimal inflation rate? Two economists have written that "policymakers should aim for an inflation rate that maximizes the economic well-being of the public" (Billi and Kahn 2007:6). We agree but would expand public wellbeing to encompass the considerable costs of crime to victims and society (McCollister, French, and Fang 2010). It is time for the unheralded consequences of low inflation for crime to become one of the guideposts for evaluating monetary policy in the United States.

APPENDIX

Sample of 17 Metropolitan Areas and Central Cities

Atlanta, GA
Boston-Brockton-Nashua, MA-NH-ME-CT
Chicago-Gary-Kenosha, IL-IN-WI
Cincinnati-Hamilton, OH-KY-IN
Cleveland-Akron, OH
Detroit-Ann Arbor-Flint, MI
Houston-Galveston-Brazoria, TX
Kansas City, MO-KS
Los Angeles-Riverside-Orange County, CA
Milwaukee-Racine, WI
New York-Northern New Jersey-Long Island, NY-NJ-CT-PA
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD
Pittsburgh, PA
Portland-Salem, OR-WA
San Francisco-Oakland-San Jose, CA
Seattle-Tacoma-Bremerton, WA
St. Louis, MO-IL

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Table 1. Descriptive Statistics

	Mean	St. Dev.	Minimum	Maximum
Acqu. crime				
Overall	7140.605	2860.389	1388.057	18332.500
Between		1670.461	4452.553	10785.350
Within		2356.409	782.004	15694.500
Inflation				
Overall	3.958	2.926	-2.600	16.500
Between		.114	3.817	4.137
Within		2.924	-2.459	16.376
Income				
Overall	27807	17685	5029	95725
Between		5381	20494	39878
Within		16896	5129	83653
Soc. disad.				
Overall	.000	.945	-1.647	3.047
Between		.792	-1.332	1.447
Within		.549	-1.985	1.600
Age 15-24				
Overall	16.330	2.383	11.499	24.286
Between		1.611	13.805	20.605
Within		1.799	8.500	20.316
Police				
Overall	30.689	8.686	6.807	52.635
Between		7.537	18.374	41.834
Within		4.683	13.731	44.217

Note:
N (observations) = 918; n (cities) = 17; T (years) = 54
Acqu. crime = acquisitive crimes per 100,000 population
Inflation = yearly percentage change in consumer prices
Income = median family income in dollars
Soc. disad. = factor score for unemployment, percent black, percent poor families, percent female-headed families with children
Age 15-24 = percent age 15-24
Police = sworn officers per 10,000 population

Table 2. Effect of Inflation and Covariates on Residual Change in Acquisitive Crime Rate (N = 901)

	Model 1		Model 2	
	b	β	b	β
Acqu. crime lag	.604*	.605	.623*	.623
	(.056)		(.060)	
Inflation	96.348*	.099	171.400*	.074
	(22.810)		(45.576)	
Income (000)	-10.254	-.063	-12.663	-.166
	(21.711)		(21.782)	
Soc. disad.	-701.826	-.245	-772.452	-.270
	(936.087)		(1085.204)	
Age 15-24	86.496	.030	28.110	.010
	(149.142)		(163.218)	
Police	19.198	.007	11.089	.004
	(36.625)		(37.435)	
Inflation x Income (000)	---	---	-3.571*	-.065
	---		(1.754)	
Wald	$\chi^2_{(16)}$ = 625.140*		$\chi^2_{(17)}$ = 886.600*	
Parameter constancy	$\chi^2_{(288)}$ = 565.370*		$\chi^2_{(304)}$ = 566.700*	

Note: Random coefficient estimates. Standard errors in parentheses. Income in thousands. Period effects not shown. See Table 1 for variable definitions.

* p < .05

Table 3. Comparison of Cities Where Inflation Effects on Acquisitive Crime are Significant and Non-Significant (N = 918)

	b	Odds Ratio
Inflation	.066	1.068
	(.035)	
Income (000)	.013*	1.013
	(.005)	
Soc. disad.	-.957*	.384
	(.140)	
Age 15-24	-.217*	.805
	(.045)	
Police	-.040*	.961
	(.012)	
Likelihood Ratio $\chi^2_{(5)}$ =	229.740*	
Pseudo R^2 =	.207	

Note: Logistic regression estimates. Cities with ns inflation effects = 1, else = 0. Standard errors in parentheses. Income in thousands. See Table 1 for variable definitions.

* p < .05

Figure 1. National and City Acquisitive Crime Rates per 100,000 Population, 1960 - 2013

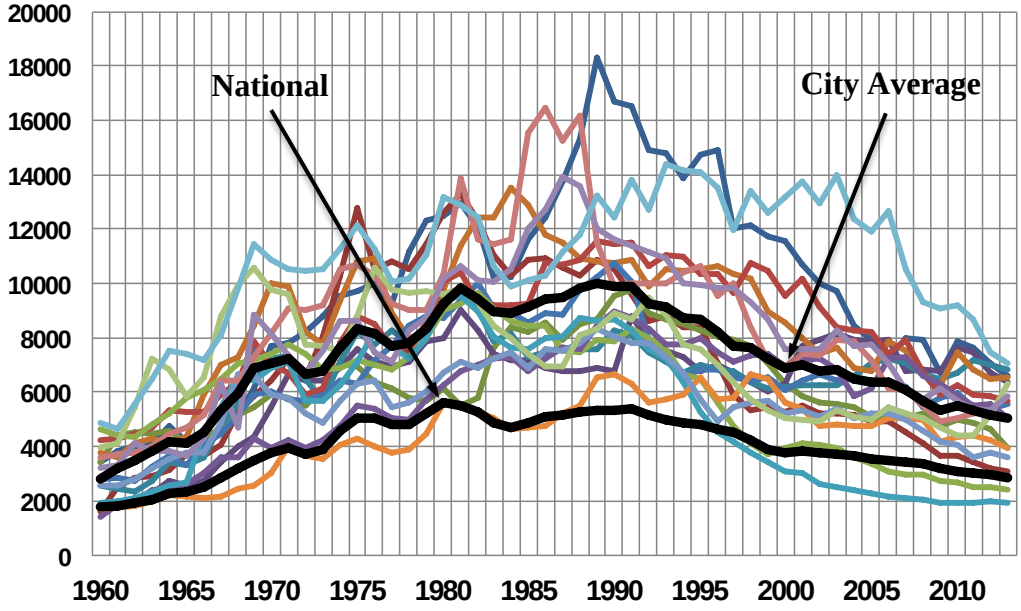

Figure 2. National and City Inflation Rates, 1960 - 2013 (%)

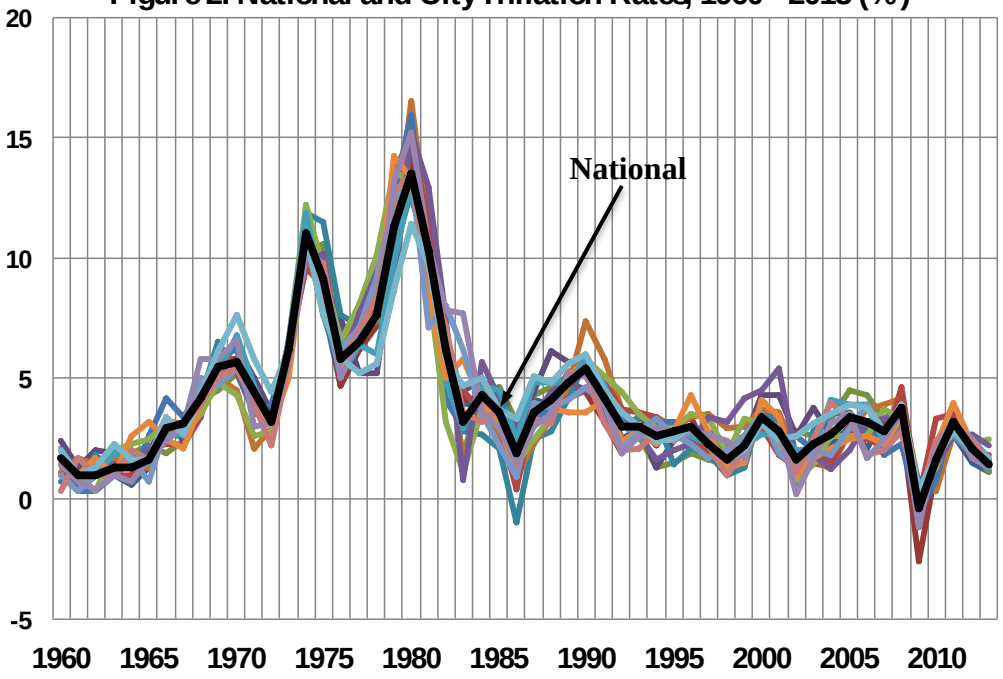

Figure 3. Inflation Effects on City Acquisitive Crime Rates in Units of Standard Deviation

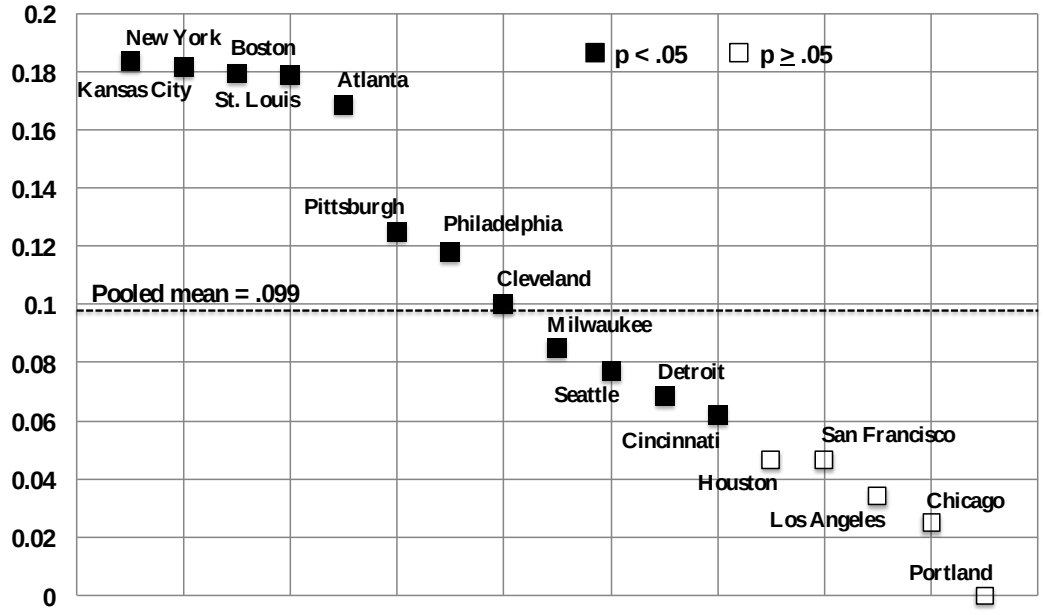
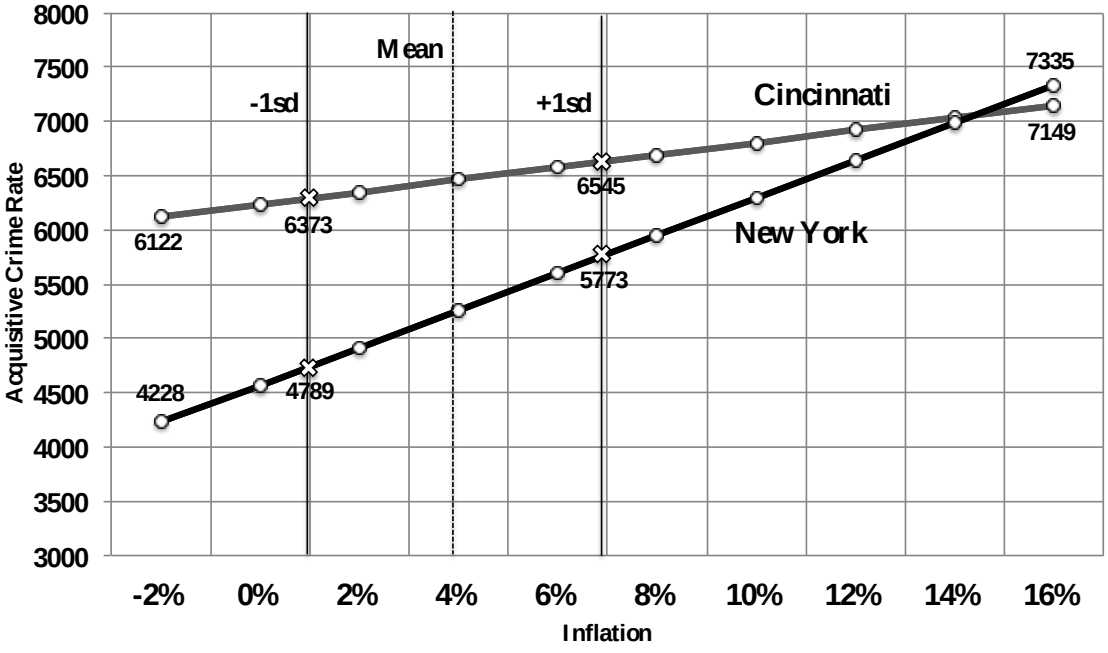
Figure 4. Predicted Acquisitive Crime Rate in Cincinnati and New York at Intervals of Inflation