

# Safeguarding Pakistanis: Punjab's Crime Problem, its Pathology and Priority for Action

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## Background

Pakistan is undergoing a critical structural transformation with rising population densities, growing urbanization and a burgeoning youth population. It is well-established that urban agglomerations in cities and towns are important drivers of productivity and value creation (Glaeser 2012, Haque 2014, Government of Pakistan 2011). However, urban agglomerations and a burgeoning youth bulge do not come without their challenges. If cities lack dynamism, increasing population densities can outstrip the capacity of urban economies to provide jobs. This problem gets exacerbated when a surge of young people enters the labor market in cities and towns. Left unmanaged, increases in urban density can lead to the great scourges of urban life: disease, congestion and *crime* (Glaeser 2012, emphasis added). Writing in the early 19<sup>th</sup> century when American cities were fighting these scourges, President Thomas Jefferson observed rather pessimistically that “I view cities as pestilential to the morals, the health, and the liberties of man.” However, *in spite* of the ongoing structural transformation there is a paucity of evidence on the consequences of growing urban agglomerations for the problem of crime<sup>1</sup> and its implications for the provision of citizen safety.

Our research aims to provide evidence on the consequences of urban agglomerations on citizen safety in Punjab, Pakistan. We focus on Punjab because it is the most populous province of Pakistan and has good quality data on registered crime. This working paper asks:

- a. How big is the connection between crime and urbanization at the district level?
- b. What are the differences in the nature and pattern of crime between the rural districts and districts at different levels of urbanization?
- c. What are the important factors that may explain the relationship between urbanization and crime? In particular, we examine the importance of labor market outcomes and weak deterrence.

We provide quantitative evidence on these questions using a 25-year (1991-2015) district-level panel dataset on registered crime, population density and other social and labor market outcomes. In addition, we buttress important findings with data from the Lahore Crime Victimization Survey, conducted by the Institute of Development and Economic Alternatives (IDEAS). By providing rigorous evidence on these

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<sup>1</sup> A notable exception is the International Crisis Group report on urban violence in Pakistan (International Crisis Group 2013).

questions, this paper aims to stimulate an evidence-based debate on the design of citizen safety policy in Punjab, Pakistan. It also describes future areas of research which hold the greatest promise for public policy in the interest of citizen safety.

## Findings

Our evidence suggests the following important findings:

- **Crime in Punjab is primarily an urban problem that has become particularly severe in large city districts.**<sup>2</sup> Our findings suggest that crime rates<sup>3</sup> were approximately 1.7 and 2.6 times higher in the large city districts of Faisalabad and Lahore, respectively, compared to their rural districts (with a population density below 300 per square kilometer) between 1991 and 2015.
- **Not only is the crime rate in large city districts higher, it grew 3 to 4.5 percentage points faster than the rate of growth of crime in rural districts from 1991 to 2015.** This means that, all else equal, the crime difference between large city districts and rural districts will become larger over time.
- **The correlation between crime and urbanization is not due to population differences.** The correlation between crime and urbanization persists even after we take into account the effect of population by using per capita crime as the outcome measure.
- **The association between urbanization and crime is unlikely to be explained by the higher likelihood to report crime in metropolitan districts.** Based on his Punjab Crime Perception Survey<sup>4</sup>, Siddique (2013) finds that the tendency to report crime is lowest in the large city sample compared to the rural and the urban town samples.<sup>5</sup> Hence, it seems unlikely that the higher reported crime rates in metropolitan city districts reflect a higher tendency to report crime. The findings are confirmed by a recent large-scale crime and victimization survey conducted by IDEAS researchers in Lahore, which doesn't find significant differences in the likelihood of reporting crime between the city's high density urban and low density rural neighborhoods.<sup>6</sup>
- **The higher crime rates in Punjab's metropolitan city districts are primarily driven by the much higher incidence of property crime in these districts.** Crimes against property include theft (including vehicle theft), burglary, robbery (including forcible snatching of vehicles), dacoity, and attempts at all these offences (e.g. attempted robbery etc.) and extortion.
- **Homicide rates are higher in all categories of urban districts compared to rural districts.** However, we find that this difference is significantly lower than the difference in property crime between these areas. Since homicide is an accurately reported crime it reinforces our view that higher crime in urban districts is unlikely to be caused by differences in reporting behavior.
- **An increase in youth (15-29 years) unemployment has a large and significant effect on property crime in large city districts.** We find that a one standard deviation (SD) increase in youth unemployment results in a 14% increase in per capita property crime in Faisalabad and a 20% increase in Lahore, which is a large effect. Youth unemployment has an insignificant relationship

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<sup>2</sup> These districts are Faisalabad and Lahore.

<sup>3</sup> This is defined as crime per 100,000 population.

<sup>4</sup> The survey was conducted in 2009 and is representative of rural areas, small towns and metropolitan cities.

<sup>5</sup> Siddique (2013) finds that the reporting rate in metropolitan cities (27%) is much lower than the rate in the urban town sample (49%) and marginally lower than the rate in rural areas (29.5%). This finding is similar to the finding for the US (Glaeser and Sacerdote 1999).

<sup>6</sup> The Institute of Development and Economic and Alternatives (IDEAS) Crime and Victimization Survey (CVS) in Lahore finds that 40% of victims report crime in dense urban neighborhoods as compared to 48% in low density rural neighborhoods and it finds that this difference is not statistically significant. The IDEAS Lahore CVS was conducted between October 2016 and January 2017. It consists of a random sample of 5040 respondents that is representative of Lahore's local neighborhoods. For details see Cheema et.al (2017)

with property crime in other districts. This finding suggests that there is a direct relationship between the nature of growth in Punjab's large city districts and crime. The large effect of youth unemployment on crime suggests that improving labor market outcomes for young adults in large districts has to be at the heart of the Government of Punjab's policy on citizen safety.

- **Another important determinant of the relationship between property crime rates and urbanization appears to be weak judicial deterrence in large city districts.** We find that deterrence measured by per capita incarceration rates is not correlated with property crime in large city districts. Contrary to this we do find that incarceration has a negative effect on property crime in other districts. This suggests that there are factors that are muting the effectiveness of deterrence in large city districts.
- **An important factor muting deterrence in large city districts is poor information or the lack of knowledge about perpetrators among victims in these districts.** The crime and victimization survey conducted by IDEAS researchers in Lahore<sup>7</sup>, a mega city of 11.1 million, provides support for the hypothesis that victims lack information about their perpetrators. It finds that only 19% of respondents who had suffered from victimization had any information about their perpetrators. It also shows that this lack of information has an adverse impact on case pendency and arrest rates. This suggests that heightened anonymity in urbanized districts is an important factor weakening deterrence in these areas.
- **We also find that the effectiveness of investigation falls in large city districts.** We use the percentage of untraced cases in total registered cases as our measure of effectiveness of investigation and find that it is positively correlated with urbanization. This suggests that strengthening deterrence in metropolitan districts must also be central to the Government of Punjab's policy on citizen safety.

## Implications for citizen safety policy

This evidence has several implications for public policy:

- Prioritizing citizen safety in the metropolitan city districts has to be recognized as a core public policy objective by the Government of Punjab. The good news is that the Government of Punjab is cognizant of this objective and it has already introduced and is in the process of scaling up ambitious measures to increase the efficiency of the urban policing.<sup>8</sup> The thrust of these initiatives is on applying modern technology to crime prevention. The government has also institutionalized an integrated command, control, and first responder system<sup>9</sup> in Lahore and is in the process of scaling this up to other cities.
- Controlling property and street crime in the metropolitan city districts has to be an important focus of the government's policy regarding citizen safety. Historically, the police have not prioritized the control of street crime and it is time to reassess this priority in light of our findings, as it has important implications for citizen safety in metropolitan districts.
- The evidence strongly suggests that the next step is for the Government of Punjab to develop a holistic policy framework for citizen safety that gives primacy to generating youth employment in large city districts in addition to strengthening deterrence. Designing a holistic framework that

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<sup>7</sup> For a detailed discussion see Cheema et. al. (2017).

<sup>8</sup> For a review of these interventions see MIT Technology Review Pakistan (2017).

<sup>9</sup> The integrated call for service has been institutionalized by the Punjab Safe Cities Authority as part of their integrated command, control and communication center (PPIC3).

emphasizes generating youth employment requires addressing two important questions: (i) what types of employment interventions promise the best value-for-money in terms of citizen safety and (ii) which youth should these interventions target for optimal results?

- The challenge for the government is that the size of the incarcerated population is having muted effects on crime reduction in large city districts. This suggests that the scale of incarceration is not increasing deterrence and there is a need to reexamine the investigation, intelligence and penal regime in large cities. This is an important area of future policy research that needs to unpack the causes underlying this finding as this has important implications for the design of policy interventions.
- The challenge for reformers is to suggest innovative interventions that can strengthen deterrence in an environment where information on offenders with victims and the police is sparse. In the current context, the police need to innovate and move beyond the traditional model of reactive policing and build the capacity for proactive, preventive patrolling in Lahore. It would do well to begin by reviewing innovations that were introduced in the United States in the 1990s and 2000s, such as hotspot and problem-oriented policing, once the weaknesses in the standard model had been well documented. The main objective of this approach is prevention and by nature it has to be forward-looking, analytical and smart and it should have the capacity to respond swiftly in order to alter the cost and benefit for criminals who are mobile. This intervention should leverage the impressive public investment made by the Government of Punjab in PPIC3 Lahore, which is a global standard technological capability that integrates calls for service, real time surveillance using CCTVs and mobile cameras and rapid response units tied to a dispatch center.
- Strengthening deterrence in large city districts will also require modernizing and adequately resourcing investigation and intelligence. The current availability of resources for police investigation in large cities is on the lower side and this resource gap needs to be addressed on an urgent basis. However, government policy needs to go beyond the provision of resources and focus on improving the quality of investigators and the incentive structure under which they operate. The recent establishment of a state-of-the-art forensic laboratory in Punjab is an important investment in the right direction.
- What is clear is that large city districts are facing significant challenges related to citizen safety that the post-colonial model of policing, which was designed to control what was essentially a rural society, is unable to mitigate successfully. There is a need to reform the post-colonial model of policing and replace it with an effective model of metropolitan policing. An important challenge for metropolitan policing in Punjab is that victims and communities aren't knowledgeable about perpetrators and criminals. This is an important factor underlying weak deterrence in metropolitan cities. There is a need to analyze whether geographic units of policing are effective in this context or if there is a case for functional reorganization of local police in metropolitan cities.

The next section provides the social and demographic context for this report. The remaining sections provide the evidence that underpin our findings.

## The context: Punjab's demographic and urban transformation

There are two defining features of the ongoing structural transformation in Pakistan: (i) its fast rate of urbanization and (ii) a burgeoning "youth bulge", with two-thirds of its population under the age of thirty

(Sathar et. al. 2013). These features are extremely salient in Punjab. Estimates that use more rigorous criteria to define urbanization<sup>10</sup> show that Punjab has emerged as Pakistan’s most urbanized province (Table 1).

**Table 1: Urban-Rural Categorization (% provincial population)**

|             | Urban | Urbanizing | Rural |
|-------------|-------|------------|-------|
| Punjab      | 39.7  | 33.2       | 27.1  |
| Sindh       | 39.8  | 19.4       | 40.8  |
| KP          | 17.4  | 27.7       | 54.9  |
| Baluchistan | 0     | 11.6       | 88.4  |

**Source:** Ali (2013). The estimates are based on the 1998 census. The definitions used by Ali (2013) are much more stringent than the definition of urban areas used in Europe and the US.

**Note:** For a definition of urban, urbanizing and rural areas see footnote 5.

Estimates show that Punjab had the same proportion of its population residing in urban agglomerations as Sindh in 1998. However, it had a much higher proportion of its population residing in what Ali (2013) refers to as “urbanizing” areas compared to other provinces (Table 1). Urbanizing areas are agglomerations with significant densities that have diluted their rural features. Ali (2013) also shows that there has been a spread of urbanization in Punjab that is occurring in a diverse set of locations and is not confined to a few large cities. Today the province is home to nine cities with half a million or more people. **The rate at which urbanization is increasing and spreading makes it important to analyze the relationship between urban agglomerations, crime and citizen safety in Punjab.**

We analyze the relationship between crime and urbanization in Punjab by estimating the differences in crime rates across the following six types of districts<sup>11</sup>:

1. Rural districts: We classify districts as rural if they have densities of less than 300 persons per square kilometer in 2015.
2. Urbanizing districts: We classify districts as urbanizing if they have attained densities between 300 and 600 persons per square kilometer in 2015.
3. Urban I: We classify districts as urban I if they have attained densities between 600 and 900 persons per square kilometer in 2015.
4. Urban II: We classify districts as urban II if they have attained densities between 900 and 1200 persons per square kilometer in 2015.
5. The large city district of Faisalabad had a population density of 1300 persons per square kilometer in 2015. We classify this district as a “large city district” because it includes the large city of Faisalabad with a population of 7.9 million in 2017.
6. The large city district of Lahore had a population density of 5900 persons per square kilometer in 2015. We classify this district as a “large city district” because it includes the large city of Lahore with a population of 11.1 million in 2017.

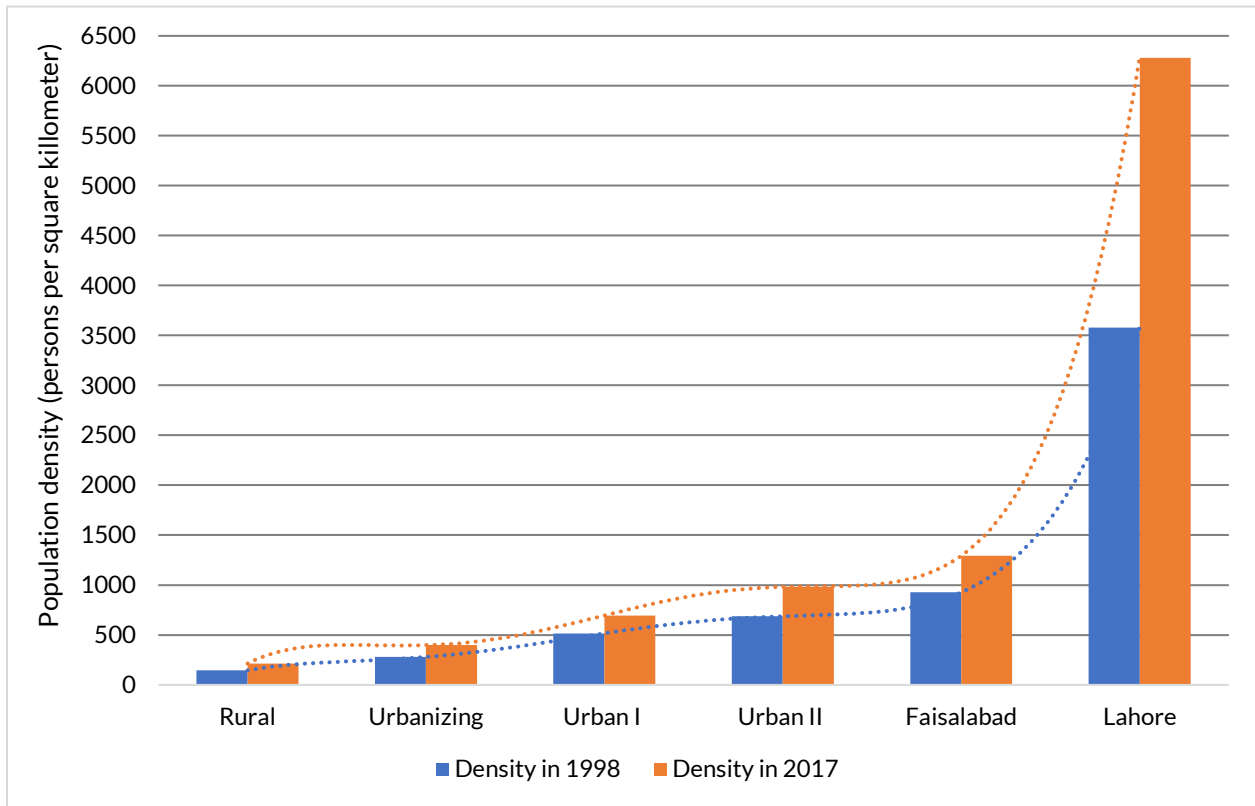
<sup>10</sup> Ali (2013) uses a definition of urbanization that takes into account population density, proximity to a city and the existence of a city core. He defines urban areas in a province as areas: (i) with a minimum density of 500 persons per square kilometer (skm) overall, (ii) classified as urban in the 1998 Census with a minimum population of 100,000 and (iii) contiguous to a city or town with a minimum density of 500 persons per skm. Urbanizing areas are defined as areas that: (i) have a population density of 250 persons or more per skm overall and 400 persons per skm in the case of a town, (ii) are classified as a town in the 1998 Census and have a minimum population of 50,000 and (iii) lie within a 75-minute distance of a city with a minimum population of 100,000. All other areas are classified as rural.

<sup>11</sup> See Table A-1 in appendix A for the names of districts in each category.

Following Ali (2013) our preferred typology of districts is based on population densities. District densities are calculated for 2015 using the data given in the population censuses of 2017 and 1998. We refer to categories three to five above as urban districts to distinguish these from urbanizing and rural districts.

Figure 1 plots the population densities for each of our six district categories for 1998 and 2017. It shows large increases in densification (ranging between 47% and 76%) across all types of districts. It shows that there has been no convergence in densification during this period across district types. In fact, the largest increase in densification during this period is observed in the large city district of Lahore.

**Figure 1: Population Density by District Category 1998 and 2017**



Source: Population Census (1998, 2017).

Note: Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

Punjab also has a burgeoning youth bulge that is resulting in a rapid entry of young adults into the labor market (Sathar et. al 2013 and Government of Punjab 2015). Estimates suggest that the province's economy will need to create around 1 million jobs every year in order to avoid rising unemployment rates (Government of Punjab 2015). This transformation provides the context for our analysis.

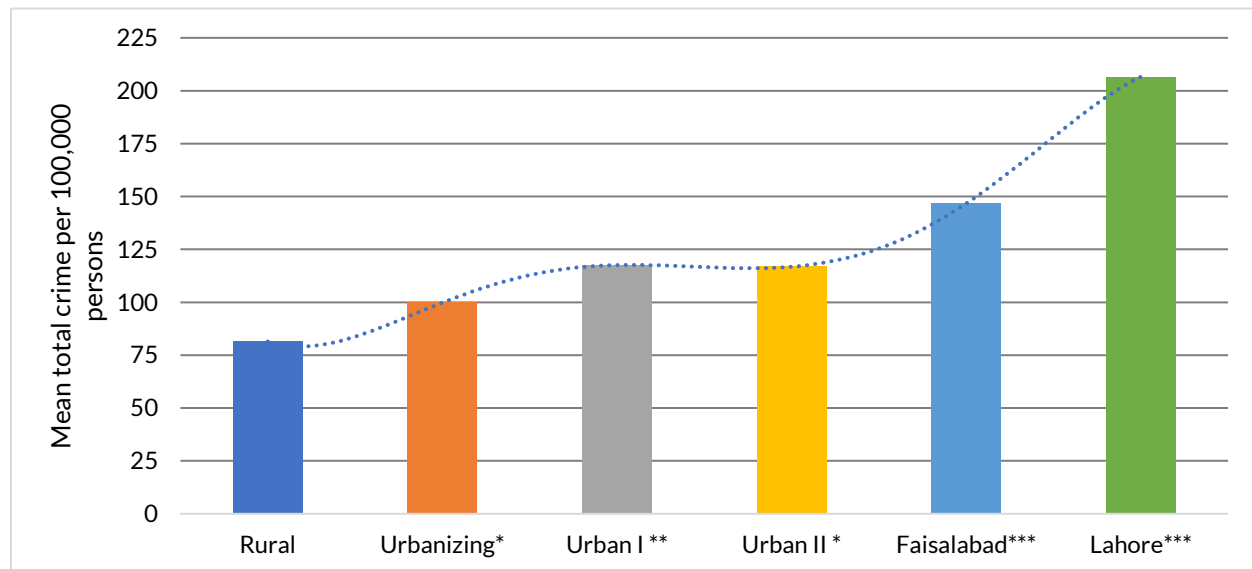
## How close is the connection between crime and urbanization?

This is an important question because increasing densification in districts is an important feature of the ongoing structural transformation in Punjab. We answer this question using a 25-year district-level panel on crimes against persons and crimes against property registered with the Punjab Police (see Table A-3 in

appendix A for definitions). We use registered crimes per 100,000 people because this is a standard measure used in the literature.<sup>12</sup> The standard explanation in policy circles is that rising crime simply reflects the growth in population. The advantage of the proposed measure is that it allows us to analyze the level, trend and pattern of crime after controlling for the effect of population growth.

**Evidence reveals that crime in Punjab is primarily an urban problem that is assuming serious proportions.** The average total crime rate (see Table A-3 in appendix A for the definition) in large districts is 2.6 times (Lahore) and 1.7 times (Faisalabad) higher compared to rural districts between 1991 and 2015 (Figure 2). Total crime is an aggregate of registered crimes against persons and property.<sup>13</sup> The average crime rates in urban I and II districts are 1.3 times higher than rural districts. Our econometric analysis finds statistically significant differences in crime rates between rural districts and the other district categories.<sup>14</sup>

**Figure 2: Average Total Crime Rates by District Category (1991-2015)**



**Source:** Punjab Police Registered Crime Data<sup>15</sup> (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017). **Note:** (1) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis. (2) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

This means that the crime escalation is positively and significantly correlated with rising population densities in districts, which is a fundamental correlate of urbanization. **The evidence suggests that crime in Punjab has become particularly severe in Punjab’s large city districts.**

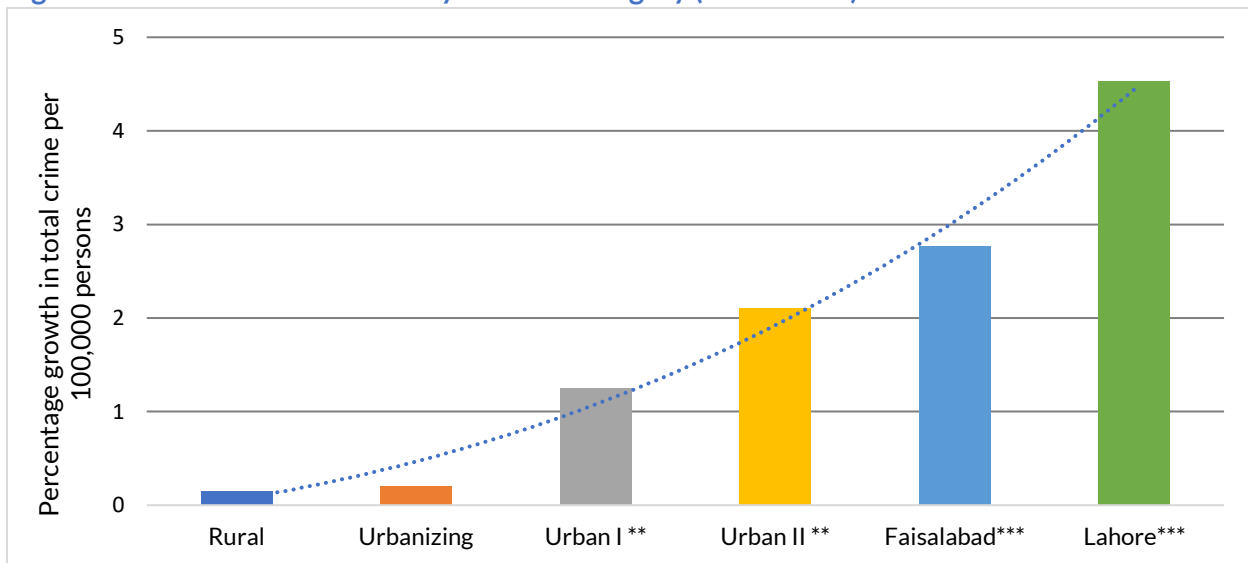
There is a potential concern that higher rates of registered crime in the two large city districts may simply reflect a higher tendency to report crime in these districts compared to other urban and rural districts. We find that this is unlikely to be the case as Anjum and Siddique’s (2009) representative survey of rural areas, towns and large cities finds that the tendency to report crime is lowest in the large city sample compared to the rural and the urban town samples. The findings are confirmed by a recent large-scale crime and

<sup>12</sup> We use district-level population projections, which are based on growth rate estimates based on the 1998 and 2017 censuses.  
<sup>13</sup> Crimes against property include theft (including vehicles theft), burglary, robbery (including forcible snatching of vehicles), dacoity, and attempts at all these offences (e.g. attempted robbery etc.) and extortion. Crimes against persons include murder, assault, attempted murder and kidnapping for ransom and include attempts at all these offences.  
<sup>14</sup> Regression analysis shows that these results are statistically significant even after we control for time effects and a range of district-level demographic and social variables along with labor market factors. Table A-2 in appendix A provides details on the data used. These results are based on regressing the log of the crime rate at the district level on the six district density categories taking the rural category as our base (given in Table 1 of Appendix A) using a 25-year panel for the time period 1991-2015. The results are robust to including divisional controls.  
<sup>15</sup> This data is based on first information reports (FIRs).

victimization survey conducted by IDEAS researchers in Lahore, which doesn't find significant differences in the likelihood of reporting crime between the city's high density urban and low density rural neighborhoods.<sup>16</sup> Therefore, it seems that the difference in crime rates is likely to be explained by real differences in crime.

**Evidence also suggests that not only is crime higher in urban districts than in rural districts, it is also growing at a much faster rate (Figure 3).** The rate of crime is growing at between approximately 3% and 4.5% per annum in the large city districts of Faisalabad and Lahore respectively, which is two to five times higher than the rate of growth of crime in the rural districts (with densities of less than 300 persons per square kilometer).<sup>17</sup> Crime in other urban districts was also growing 1.3% to 2.1% faster than the rate in rural districts in the same period. What we are seeing is a step function with the growth rates in crime doubling as district densities cross 600 persons per square kilometer and doubling again in Punjab's large city districts. This has two implications. All else equal, the crime difference between large city districts and rural districts is going to become larger and larger over time. Furthermore, it is likely that we will see much higher rates of growth of crime as other districts attain density levels of 900 persons per square km. This is not unlikely given that urbanization is rising and spreading in Punjab. **This evidence strongly suggests that prioritizing public safety in urban and especially the large city districts has to be recognized as a core public policy issue by the Government of Punjab.**

**Figure 3: Growth in Total Crime by District Category (1991-2015)**



Source: Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017).  
 Note: (1) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis. (2) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

<sup>16</sup> The IDEAS Lahore CVS finds that 40% of victims report crime in dense urban neighborhoods as compared to 48% in low density rural neighborhoods and it finds that this difference is not statistically significant.

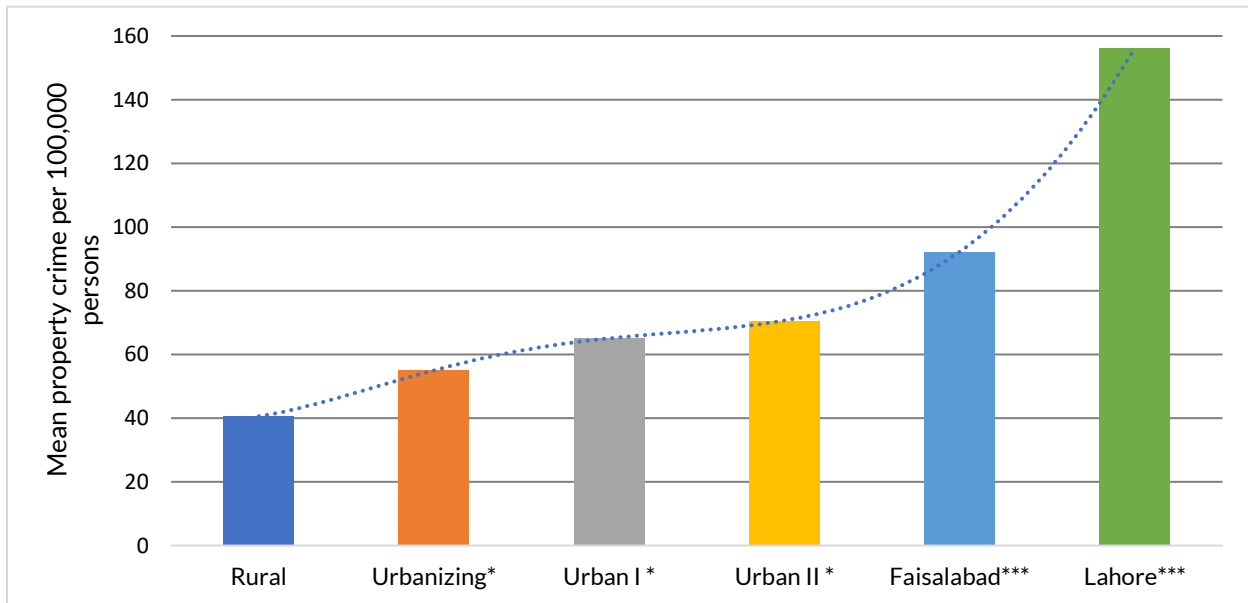
<sup>17</sup> Regression analysis shows that the growth rate differences between metropolitan city and rural districts are statistically significant. The growth regression uses a 25-year district level panel (1991-2013) to regress differences in the log of crime rate on initial population densities in the six district density categories after controlling for time effects and the control variables listed in footnote 14.



## The nature of the crime problem in metropolitan districts

The high level and growth of property crime is the main factor driving the higher crime rates in the urban districts and especially the large city districts (Figures 4 and 5). Property crime rates are 2.3 times and times higher in the large city districts of Faisalabad and Lahore respectively compared to rural districts.<sup>18</sup>

Figure 4: Average Property Crime Rates by District Category (1991-2015)



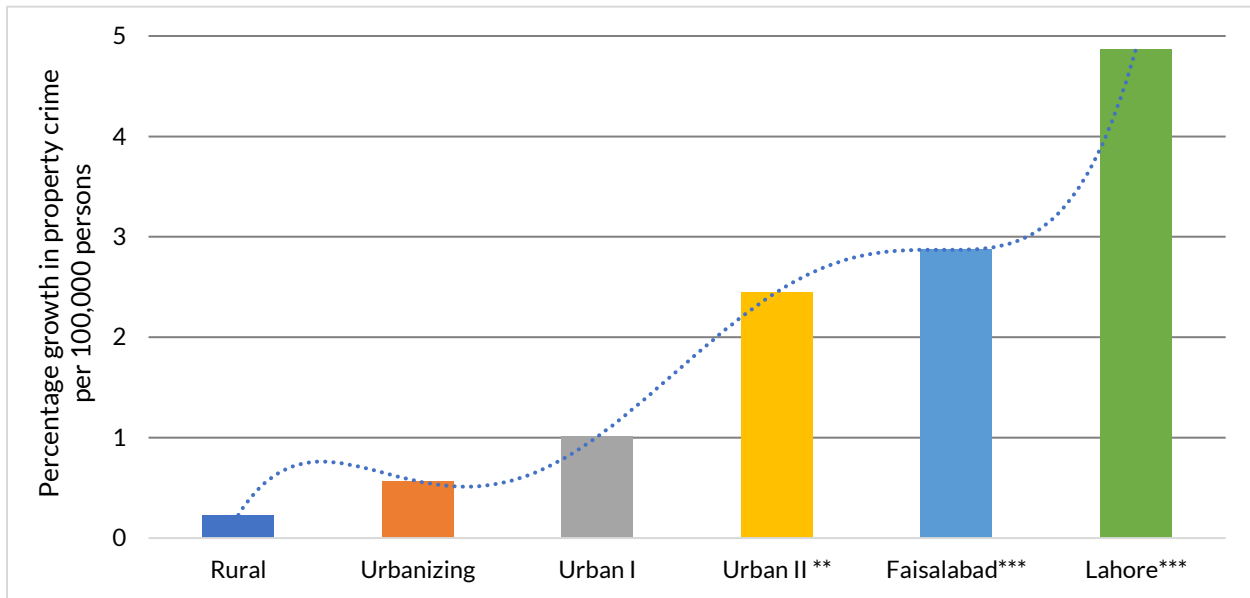
Source: Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017).

Note: (1) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis. (2) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

Property crime is growing at between approximately 4% and 7% per annum in the large city districts of Faisalabad and Lahore respectively, which is four to seven times higher than the rate of growth of property crime in the rural districts (Figure 5). **This evidence suggests that controlling property crime in the large city districts has to be an important focus of the Government of Punjab's policy to ensure public safety.**

<sup>18</sup> Regression analysis shows that these differences are statistically significant. We run the same regression specification for property crime as the specification described in footnote 14.

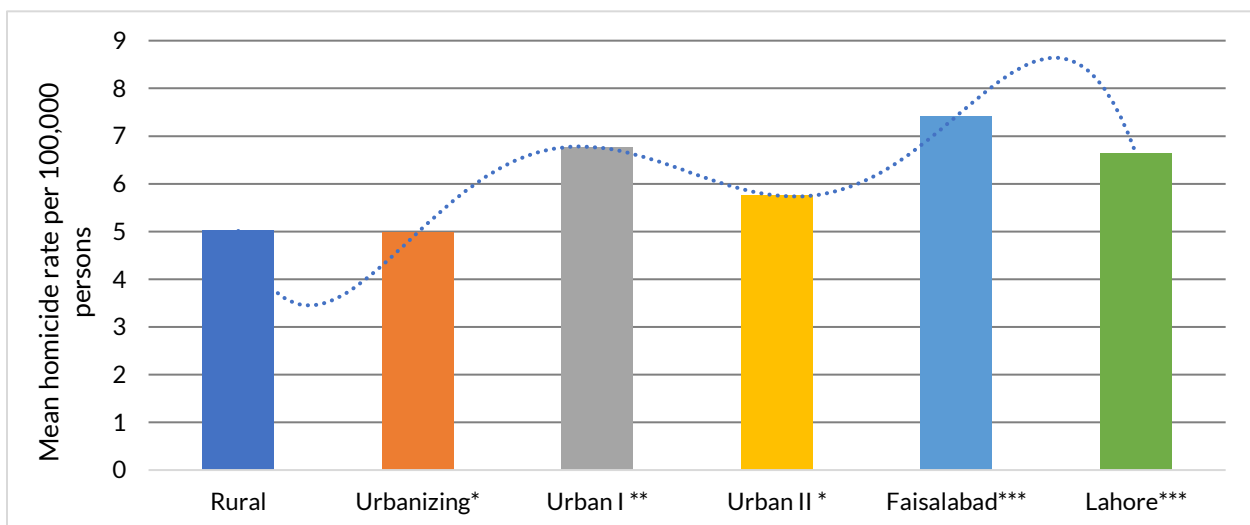
**Figure 5: Growth in Property Crime by District Category (1991-2015)**



**Source:** Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017)  
**Note:** (1) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis. (2) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

**Violent crime is also related to rising population densities in the urban districts.** This can be gauged from the fact that homicide rates are significantly higher in all categories of urban districts compared to rural districts<sup>19</sup> (Figure 6), although these differences are much smaller than the differences in property crime. However, there are no significant differences in homicide rates between different categories of urban districts.

**Figure 6: Average Homicide Rate by District Category (1991-2015)**



**Source:** Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017).  
**Note:** (1) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis. (2) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

<sup>19</sup> Regression analysis shows that these differences are statistically significant. We run the same regression specification for homicide as the specification described in footnote 14.

# The determinants of rising crime in urban districts: The framework

In this section we focus on unemployment and deterrence as they are recognized as important determinants of crime in standard models (Becker 1968 and Ehrlich 1996). Unemployment is expected to have a positive effect on crime by lowering individuals' opportunity cost of engaging in criminal activity. We are interested in measuring the differential impact of labor market outcomes on property crime in our different district categories as our interest is in analyzing the importance of labor market variables as determinants of the relationship between crime and urbanization. Whether unemployment has a differential effect on crime in urban districts is an empirical question and depends on the relative effectiveness of urban labor markets in specific contexts.

We estimate the differential effect of the following labor market variables on property crime in urban areas:

a. Adult unemployment is defined as the percentage of 30 to 64 year-olds actively seeking work who have been unable to find employment in the last week or could not work due to being ill or being temporarily laid off. Adult unemployment is expected to have a positive effect on crime by lowering the opportunity cost of engaging in criminal activity.

b. Youth unemployment uses the same definition of unemployment as adult unemployment but applies to 15 to 29 year-olds. We focus on youth unemployment because a burgeoning youth population is an important element of the demographic transition in Punjab. Rising youth unemployment is expected to have a positive effect on crime through the same opportunity cost mechanism described for adult unemployment above.

The data on these measures comes from the labor force surveys between 1991 and 2015.

Deterrence is argued to affect crime rates by altering the expected cost of committing crime. Glaeser and Sacerdote (1999) argue that urbanization is likely to "lower the costs of crime by lowering the probability of arrest and the probability of punishment conditional on arrest" (pg. 236). This argument rests on the assumption that the effectiveness of detection declines in urban areas because greater anonymity in these areas increases the cost of detection and apprehension.

This report uses the following two measures to estimate the effect of deterrence:

The **incarceration rate** is defined as the number of individuals under arrest for property crime in a district per 100,000 population. This measure is calculated for every district on an annual basis using data collated by the Punjab Police. We only have data for 2006-2015 and hence we have a nine-year panel for this variable.

The **untraced investigation rate** is defined as untraced investigations as a percentage of registered cases. This measure is also calculated for every district on an annual basis using data collated by the Punjab Police. This is a proxy measure for the effectiveness of investigation which is an important component of deterrence. Again, we only have this variable for 2006-2015.

In the next section, we estimate the effect of these variables on property crime rates in our six district categories using panel regressions.<sup>20</sup> We estimate regressions that report standardized coefficients, which

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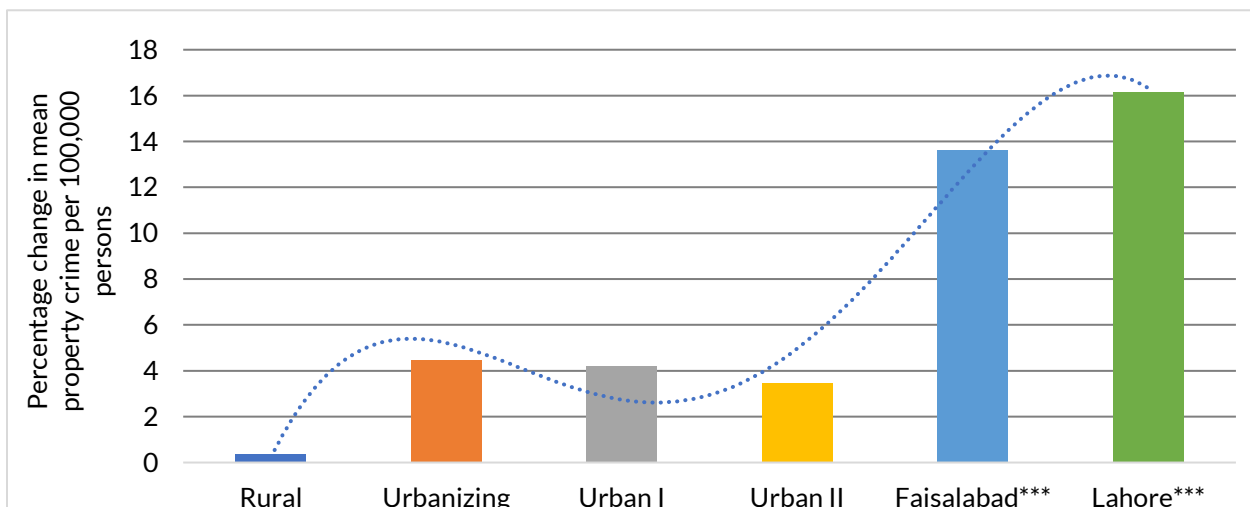
<sup>20</sup> We regress log of property crime rates at the district level on these variables of interest and their interaction with our six district density categories using the rural category as the base category. We do this for the relevant period for which data is available. We are

is to re-express coefficients as the effect of one SD change in the explanatory variables of interest (adult unemployment, youth unemployment and per capita incarceration rates) on the percentage change in mean property crime in the relevant type of district. We report standardized coefficients because by placing everything on a common metric of SD's we find comparability across reported coefficients. We also estimate the differences in the percentage of untraced cases across our six district density categories<sup>21</sup> to examine whether the effectiveness of investigation declines with urbanization.

## The determinants of rising crime in urban districts: The evidence on labor market outcomes

Figure 7 reports the percentage increase in mean per capita property crime (per 100,000) in different types of districts as a result of one SD change in adult unemployment in the relevant district type.<sup>22</sup> It shows that adult unemployment has a positive relationship with the property crime rate. However, this relationship is only significant in Faisalabad and Lahore. We also find that there is a large effect of adult unemployment on per capita property crime in the large city districts. We find that one SD increase in adult unemployment results in a 14% increase in mean per capita property crime in Faisalabad and a 16% increase in Lahore. **This suggests that economic outcomes have a direct effect on public safety in the large city districts and that economic policy measures that affect employability need to be included in public safety policy.**

**Figure 7: The Effect of Adult Unemployment on Property Crime by District Type**



**Source:** Authors' calculation using Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017).

**Note:** (1) Regression with time fixed effects only; (2) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis; (3) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

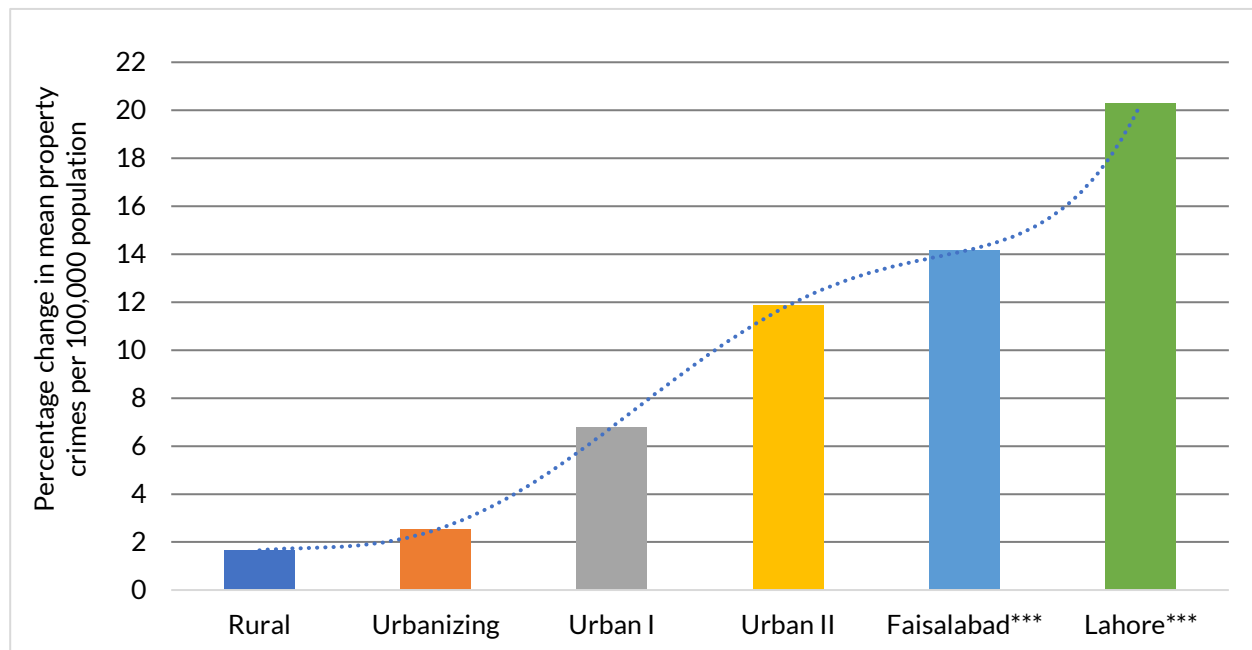
interested in the significance and size of the coefficient on the interaction terms. We control for time effects and other control variables described in footnote 14. The results are robust to divisional controls.

<sup>21</sup> We run the same regression specification for percentage of untraced cases as the specification described in footnote 14.

<sup>22</sup> In figures 7 and 8 we are interested in the coefficient of the interaction term between the labor market variables and our six district categories.

Figure 8 shows that youth also has a positive relationship with the property crime rate. Again, the relationship between youth unemployment and property is only statistically significant in the large city districts. Comparing figures 7 and 8 we find that one SD change in youth unemployment (Figure 8) has a bigger effect on per capita property crime in large city districts compared to the effect of adult unemployment. We find that a one SD increase in adult unemployment results in a 14% increase in mean per capita property crime in Faisalabad and a 20% increase in Lahore. This suggests that the economic opportunity cost of engaging in crime for the youth is relatively low in metropolitan districts and this is likely to increase the incentive of young adults to engage in criminal activity. **Youth unemployment is, therefore, an important determinant of property crime rates in large city districts and improving labor market outcomes for young adults has to be at the heart of the Government of Punjab’s policy on citizen safety in these districts.**

**Figure 8: The Effect of Youth Unemployment on Property Crime by District Type**



Source: Authors’ calculation using Punjab Police Registered Crime Data (1991-2015), Labor Force Surveys (1991-2015) and Population Census (1998, 2017).

Note: (1) Regression with time fixed effects only; (2) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis; (3) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

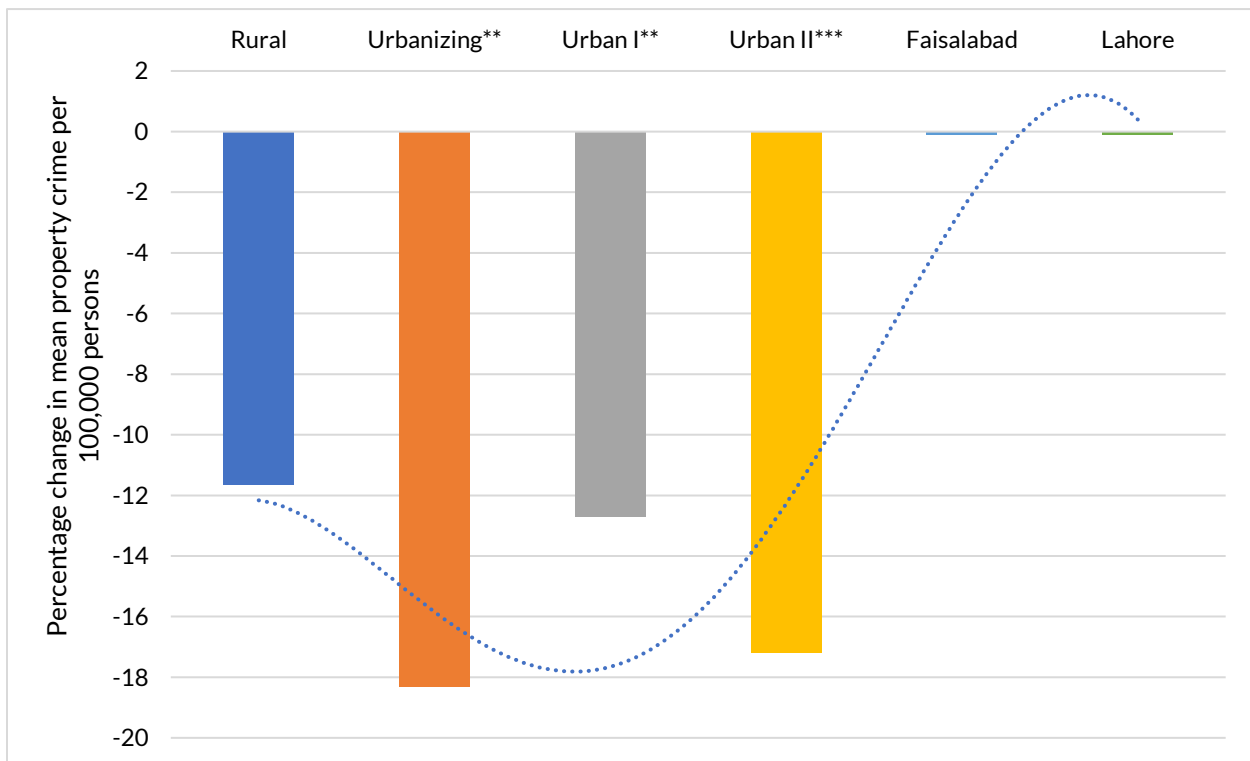
## The determinants of rising crime in urban districts: The evidence on deterrence

We start by analyzing the relationship between deterrence and per capita property crime in our six district categories. Figure 9 reports the percentage change in mean per capita property crime (per 100,000) in different types of districts as a result of one SD change in per capita incarceration rates in the relevant district type.<sup>23</sup>

<sup>23</sup> In Figure 9 we are interested in the coefficient of the interaction term between our measure of deterrence and our six district categories.

If deterrence is effective, we should find a negative relationship between our measure of deterrence and change in property crime. We find that the incarceration rate has a negative relationship with the property crime rate for all our district categories except the large city districts, where it has no significant effect. This could be due to factors muting the effect of deterrence in a large city context. It is well recognized in the literature that anonymity is higher in metropolitan cities and this has consequences for the effectiveness of criminal justice outcomes in these contexts (Glaeser and Sacerdote 1999, Wilson and Herrenstein 1995). Putnam (1993) and Wirth (1938) argue that community-based sanctions are likely to be weaker in cities because people are more transient and anonymous, which is expected to weaken the cohesiveness of communities. An important underlying channel of weak deterrence in urban contexts is the lack of knowledge about perpetrators among victims and communities, which makes it harder to identify and apprehend perpetrators.

**Figure 9: The Effect of Deterrence on Property Crime by District Type**



Source: Authors' calculation using Punjab Police data (2006-2015), Labor Force Surveys (2006-2015) and Population Census (1998, 2017).

Note: (1) Regression with time fixed effects only; (2) \*, \*\*, \*\*\* show significance at 10%, 5% and 1% respectively in regression analysis; (3) Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

## The urban anonymity challenge

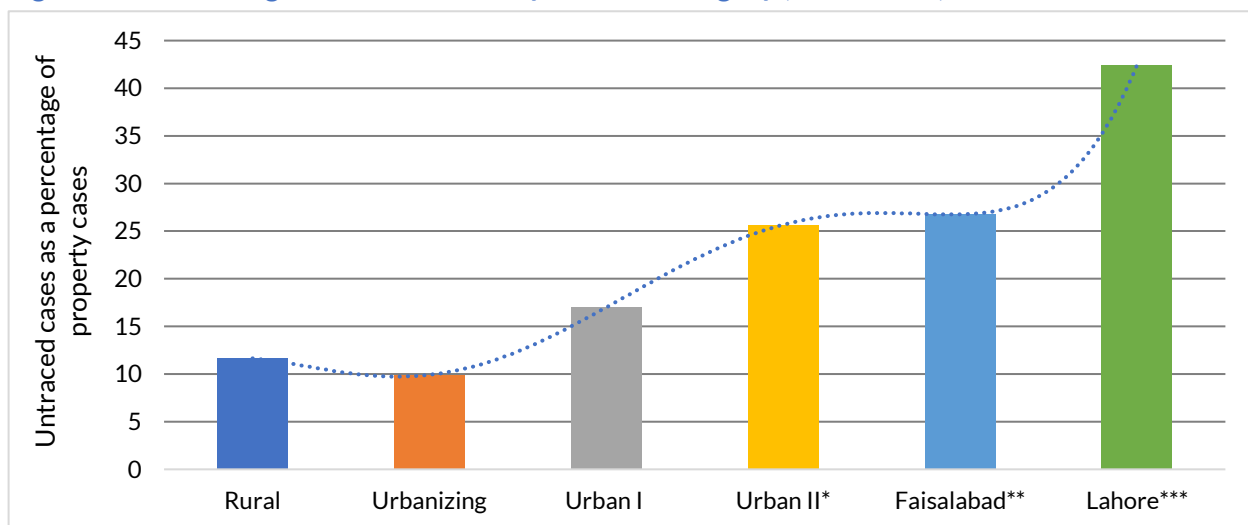
The crime and victimization survey conducted by IDEAS' researchers<sup>24</sup> in Lahore, a mega city of 11.1 million, provides support for the hypothesis that victims lack information about their perpetrators. It finds that only 19% of respondents who had suffered victimization had any information about their perpetrator. The pendency rate of complaints under investigation with the police is close to 40% in cases where a victim had some relevant information about their perpetrator and this percentage rises to around 90% in cases where

<sup>24</sup> For a detailed discussion see Cheema et. al. (2017).

the victim did not have any information. A lack of information about the perpetrator also has a significant effect on reducing the arrest rate for reported crimes that have closed investigations. The arrest rate is close to 80% in cases where victims have information about their perpetrator and this percentage falls to around 20% in cases where victims did not have any relevant information. This suggests that paucity of information about perpetrators in a large city context – what we call the “urban anonymity challenge” – may be an important factor weakening judicial deterrence in large city districts.

If this is the case, we should expect to find the effectiveness of investigation to fall in large city districts. We test this hypothesis by analyzing the variation in the percentage of untraced cases in total registered cases (a measure of the effectiveness of investigation) across our district categories (Figure 10). We find that compared to rural districts, the percentage of untraced cases increases by 15% as districts reach a density of 900 per square kilometer and increase by another 15% or so in Lahore. This suggests a declining effectiveness of investigation in more urbanized districts. An important underlying cause of weak deterrence in these districts appears to be the lack of knowledge about perpetrators (or the urban anonymity challenge) among victims and communities. This is in line with the expectation that anonymity increases with the extent of urbanization and this weakens deterrence in large cities and metropolitan areas (Glaeser and Sacerdote 1999).

**Figure 10: Percentage Untraced Cases by District Category (2006-2015)**



**Source:** Authors’ calculation using Punjab Police data (2006-2015), Labor Force Surveys (2006-2015) and Population Census (1998, 2017).

**Note:** Rural (<300 persons per sq. km), Urbanizing (300-600), Urban I (600-900), Urban II (900-1200), Faisalabad (1300) and Lahore (5900).

While the urban anonymity challenge appears to be an important factor affecting deterrence in large city districts, it could also be a result of imprisonment exacerbating the problem of social disorganization by weakening the controls of families and communities and providing individuals engaged in crime access to criminal networks and knowledge (De Fina and Arvanties 2002 and Nagin 1998). We are unable to determine the relative importance of these factors with our data and this is an important area of future research.

## Conclusion

Our findings strongly suggest that the Government of Punjab needs to develop a holistic policy framework for citizen safety that gives primacy to generating youth employment in large city districts in addition to strengthening deterrence. Designing a holistic framework that emphasizes generating youth employment requires addressing two important questions: (i) what types of employment interventions promise the best value-for-money in terms of citizen safety and (ii) which youth should these interventions target for optimal results?

Another challenge for the government is that the urban environment is weakening judicial deterrence because of the urban anonymity challenge. The challenge for reforms in this context is to design innovative interventions that strengthen deterrence in an environment where information about offenders is sparse. Therefore, there is a need for the police to go beyond the traditional model of reactive policing and build capacity for proactive preventive policing. This intervention should leverage the impressive public investment made by the Government of Punjab in PPIC3 Lahore, a global standard technological capability that integrates calls for service, real time surveillance using CCTVs and mobile cameras, and rapid response units tied to a dispatch center. Many of the measures need to build innovative capacity have already been introduced by the Punjab Police. What is required is their effective institutionalization and implementation at scale.



# Appendix A

Table 1: District Categories

| CATEGORY                                 | DEFINITION 1                       | DISTRICTS   |
|--|------------------------------------|---|
| <b>Rural</b>                             | Below 300 population per km square | Mianwali, Leyyah, Chakwal, Bhakkar, Khushab, Bahawalpur, Rajanpur, D.G.Khan, Attock |
| <b>Urbanizing</b>                        | 300-600 population per km square   | RY Khan, Bahawalnagar, Jhelum, Muzaffargarh, Jhang                                  |
| <b>Urban I</b>                           | 600-900 population per km square   | Khanewal, TTSingh, Vehari, Okara, Sargodha, Sahiwal, Gujrat, Sheikhupura            |
| <b>Urban II</b>                          | 900-1200 population per km square  | Multan, Sialkot, Kasur, Rawalpindi, Gujranwala                                      |
| <b>Large City District of Faisalabad</b> | 1300 population per km square      | Faisalabad  |
| <b>Large City District of Lahore</b>     | 5900 population per km square      | Lahore  |

**Table 2: Data Sources**

| <b>DATA SOURCE</b>              | <b>YEAR</b>   | <b>DEFINITION</b>   |
|---------------------------------|---|---|
| <b>PUNJAB POLICE CRIME DATA</b> | 1991-2015   | The Punjab Police Crime Data is used to obtain district-level data on crime incidents, investigation and incarceration.                   |
| <b>LABOR FORCE SURVEY (LFS)</b> | 1990-91, 1991-92, 1992-93, 1993-94, 1994-95, 1996-97, 1997-98, 1999-00, 2001-02, 2003-04, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2012-13, 2013-14, 2014-15 | The LFS data is used to construct district-level data on labor market variables such as unemployment rate, labor force participation etc. |
| <b>POPLUATION CENSUS</b>        | 1998, 2017  | The Censuses are used to obtain population and area figures for each district in Punjab.  |

## Appendix B

### Labor Force Survey Treatment

The Labor Force Survey is used to calculate district level labor market statistics. Although household level data from the Labor Force Survey (LFS) is available, it is unclear whether this data can be used to obtain district-level representative estimates of labor market measures. The LFS can be used to calculate district-level representative estimates of labor market measures for rural areas and for big cities. However, for peri-urban areas, excluding big cities, the estimates obtained will only be representative at the level of the administrative division and not at the level of the district. Therefore, when calculating the district level statistics, we drop all the peri-urban areas and use the data on the big city and rural areas. We use the weights provided in the LFS data to obtain district-level estimates.

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