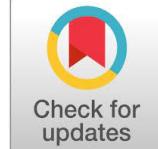


Macroeconomic Determinants of Crime against Children: A Case Study of Punjab

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ABSTRACT

Despite it being a growing cause of concern, the relationship between macroeconomic indicators and crime against children has previously remained widely unnoticed. An extensive range of literature is reviewed that gives this domain of research a different perspective by investigating crime against children existent in various countries around the world. The analysis of this paper is divided into three sections. Firstly, a regression analysis has been run using time series data taken from Punjab, Pakistan for the years 2007-2017. Applying the Ordinary Least Square Technique and using income, unemployment, and education as independent variables and crime rate against female children as the dependent variable; a regression model was run. While income and education show a statistically significant relationship, a prediction cannot be made due to a limited data availability of the crime variable. Secondly, this paper takes a descriptive approach by using a correlation matrix to observe the relationship between total crime rate against male children and unemployment, poverty and social sector spending. Results of this Matrix indicate a positive relationship between crime with unemployment and crime with poverty, while there is a negative linkage among social sector spending and crime. However, a correlation matrix can only be used to define a causal relationship between variables and not be employed to make reliable cause and effect estimations.

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INTRODUCTION

It is a universal truth that children are the future of any country. They are responsible for taking forward the nation's cultural, social values and traditions. Children are a prime driving force for a productive economy in the long run. Many children in the developing countries such as Pakistan are subject to heinous crimes due to adverse economic conditions. There are various types of crimes such

as crimes against property, organized crime, white collar crime and crimes against persons (Khan et al., 2022). This study aims to analyze crimes against persons; specifically, crimes against children. The kind of crime against children that exists around us can take many shapes and forms. It can include any kind of neglect, maltreatment and abuse towards anybody under the age of eighteen, considered to be a minor. Neglect is an act of being unable to properly look after a child that is under one's care, such as failure to provide them with appropriate and necessary nutrition, education, health, safety and protection etc.

Neglect can usually come from the parent's or the guardian's side. On the other side, abuse can take many shapes (Gateway, 2019). Firstly, there is physical abuse which involves any kind of physical injury or pain that is inflicted on the child with the aim of causing them harm. This can be done through beating, pulling of hair, burning etc. Secondly, there is sexual abuse that means forced sexual

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exploitation of an underage minor, who is not able to legally give their consent. This can be termed in different categories such as rape, child pornography etc (Manzoor et al., 2018). Thirdly, there is emotional abuse that can be interchanged with terms like neglect and emotional maltreatment; in which the child is deprived of caregiving or are put through any kind of emotional traumatic situations.

Pakistan is a country that has various problems and crime is one of them (Lodhi et al., 2023). However, when going into specificity, crime against children is an area that is more often overlooked or usually the statistics of this are converged with overall crime statistics. It is important to look at this area solely so that the root cause of such crimes can be identified and solutions to correct them can be put forth and implemented to protect our children. While talking about specificity, it is also important to segregate provincial crime statistics against children rather than taking country wide data. This paper aims to shed light on how various macroeconomic indicators can cause an increase in the rate of crime taking place against children in Punjab. The independent variables that will be included are average monthly income, education, unemployment, poverty and social sector spending. All these variables are said to have a relationship with the increasing rates of crime against children in Punjab.

Real life evidence supports the notion that

macroeconomic conditions do have a lasting impact on crime against children. Figure 1 shows the trends of crime against children over the last 11 years. This data has been collected from police station reports across Punjab, Pakistan. One of the reasons for the increase in the crime rate is that when parents are unemployed, or are driven to the extent of poverty, they cannot even afford to provide necessities to their children or even look after them. This negligence exposes them to criminals who see these children as opportunities. Moreover, this deprivation sometimes results in parents taking matters in their own hands and killing their children themselves because of inability to provide. This was exactly the case in a report written by Dawn Newspaper, about a man who killed his children and then himself due to lack of financial resources (Dharani, 2021). In some cases, parents end up committing suicide due to similar economic reasons, leaving behind their children without safety and protection, further exposing them to heinous criminal activities that take place in the Pakistani society (Ali, 2020).

Thus, this paper aims to focus on this aspect of the economy and society that is often left unnoticed. The economy and the society work hand in hand and any fluctuations in one are likely to have severe consequences on the other. Which is why, it is of utmost importance to investigate details of how macroeconomic conditions impact crime against children in Punjabi society of Pakistan.

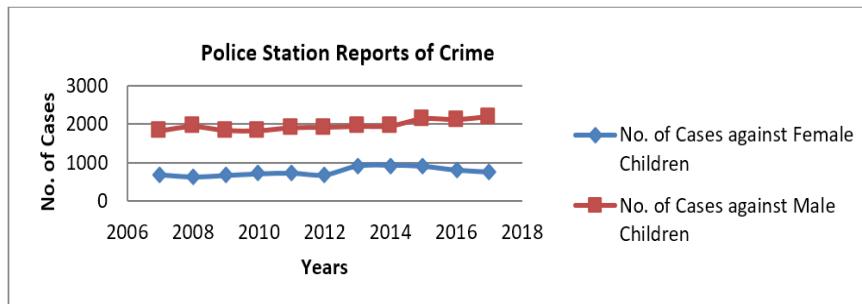


Fig. 1. Police Station Reports of Crime against Children in Punjab, Pakistan

Author's own illustrations

As mentioned previously, crime is on the rise over the past many years. Figure 1 depicts the trends of crime against both male and female children over the years in Punjab. The trends show that the cases of crimes against male children have always been higher, with it still increasing rather than decreasing. Trends of crime against female children shows fewer cases as compared to their male counterparts. This is because in a conservative society like Punjab, Pakistan, people refrain from reporting any kind of abuse against female children, as they fear of losing their respect in the area that they live in. Hence, a major sum of crime goes unreported.

This research aims to analyze how the rates of crime against children can be affected by fluctuations in the economy. There has been little research on reasons why crime against children is on the rise. While some researchers have studied various sociological, political or psychological causes, only a few have linked crime against children with adverse macroeconomic fluctuations (Manzoor & Ahsan, 2024). Especially in the case of Pakistan, a developing country subject to negative economic shocks; there is a

significant rise in child abuse and maltreatment and yet these topics are minimally researched.

The objective of this study is to identify macroeconomic reasons behind increasing crimes against children specifically females in Punjab, Pakistan. The analysis in this paper is divided into three main sections. Firstly, a thorough review of literature is attempted to explore different studies on the subject matter. Secondly, an empirical analysis is done using total crime rate against female children as the dependent variable, and average monthly income, unemployment rate and education as independent variables. Lastly a descriptive approach was used to find out the correlation matrix that showed the causal relationship between total crime rate against children and poverty, unemployment rate and social sector spending.

LITERATURE REVIEW

Different researchers view criminal activities against children from various angles and perspectives. A large portion of the available studies analyzed the determinants of crimes against children, with respect to other variables, such as income levels, employment, poverty, family backgrounds

and much more. Some studies were specifically to Pakistan.

Basharov & Laumann (1997) explored the relationship between child abuse and poverty. Using a descriptive approach for their paper, they collected and then scrutinized available evidence from various surveys. They were able to estimate the trends of child abuse and then narrow down possible reasons. The study showed that children belonging to poor or low-income households had the highest prevalence rates among different types of maltreatment. Other reasons cited were factors such as race, single parents, foster care and teen mothers. After carefully analyzing these various determinants of child abuse, they put forth policy recommendations, such as provision of long-term services that keep check and balance on families dealing with child abuse and other implementations, keeping in view the political climate of that time.

Malik (2010) carried out a study to explore the determinants of crimes against children in Pakistan, in the form of parental acceptance or rejection against their children. The main determinants included in her study were economic factors such as low-income levels and housing issues. She also identified cultural factors such as preferring boys over girls. Malik (2010) used a Child Abuse Scale (CAS): Screening Device and a Parental Acceptance-Rejection Questionnaire (PARQ) to study a sample of 200 children from five cities of Punjab. Using a Stepwise Regression Analysis, the results of her findings indicated that massively abused children found their parents to be more rejecting as compared to less-abused children. The study also concluded that the mother's education and family size were determinants of child abuse as compared to any socio-economic factors.

In their paper, Berger and Waldfogel (2011) highlighted economic determinants of child abuse, mainly citing factors such as low-income levels. They stated that this main factor then led to further sub-factors such as parents neglecting to meet the child's needs, parental depression, less investment in their child's future and reduction in parental quality etc. After a thorough review and analysis of existing studies done by previous researchers, Berger and Waldfogel (2011) found that economic elements play a key role in child neglect or abuse. However, they also stated that more concrete evidence was needed to back up these findings. Some of the consequences of such neglect noted by them were deteriorating physical and mental health due to high substance abuse, decline in cognitive and academic achievements and a reduction in employment and earnings.

Following a similar approach, Lindo and Schaller (2014) also highlighted some major economic determinants of criminal behavior, such as family income, employment and economic shocks etc. Using data from various sources such as child abuse reports, surveys, hospital and internet search data, the researchers were able to draw out a conclusion that the relationship between economic indicators and child abuse might be evident on an aggregate level rather than an individual level. Elaborating on the work he did in 1994, Pelton (2015), found that there is increased prevalence of child abuse due to economic factors such as poverty and low income. Working on his previous work, he found that there was still a strong relationship between abuse and poverty, however, the author was unable to establish causation

between the variables. The study concluded that reducing poverty is the most appropriate response to catering to the problem of child abuse and maltreatment.

To inspect the determinants of the rate of crime such as unemployment, education, poverty and economic growth in Pakistan, Khan et al., (2015) conducted an elaborated study taking time-series data from 1972-2011 and using proxy variables from the World Development Indicators. Using a Vector Error Correction Model, they concluded that crime rate and unemployment had a positive relationship; poverty had a positive relationship in the long run but a negative relationship in the short run. However, higher education and crime rate had a negative relationship. Anwar et al., (2017) conducted a similar study in finding the determinants of crime in Pakistan, taking time series data from the years 1973-2014. Taking the total crime rate (per one million population) as the dependent variable and unemployment, education, income inequality, per capita income, and deterrence variable as independent variables, the researchers analyzed this data under the Autoregressive Distributed Lag Model Approach. Using Unit Root Tests, they were able to find that under the aggregated supply of offense function, other than the exception of per capita income and income inequality, all other variables had a large impact on crime rate.

A similar study was also conducted in Australia by Doidge et al., (2017). They used logistic regression on a population-based birth cohort of 2443 children and their parents to understand economic determinants such as parental education, occupation, unemployment and poverty; and their linkage with child maltreatment in the form of physical, sexual, emotional abuse and neglect. The results of their estimation showed that the economic factors were largely related to all the child maltreatment types. They even concluded that 27% of all child abuse was a result of economic determinants. Similarly, Raissian & Bullinger (2017) explored the relationship between household income levels and child maltreatment. Using reports from the National Child Abuse and Neglect Data System for the years 2004 to 2013, they were able to conjecture that a \$1 increase in the minimum wage led to a 9.6% decrease in the number of cases reported on child maltreatment. Thus, they were able to infer that more policies related to an increase in income levels should be used to improve the wellbeing of children.

Going a little further back in history, Schneider et al., (2017) looked at child maltreatment considering the great depression between 2007 and 2010, by using longitudinal data from the Fragile Families and Child Wellbeing Study. They used macroeconomic indicators such as the national consumer sentiment index and the unemployment rate, along with a few control variables. The results showed that the recession and these indicators had a direct impact on the risk of child abuse and neglect, with little or no measures in effect to control this. Letourneau et al., (2018) observed the economic impact of crimes against children in the USA. According to the study, child sexual abuse costs were measured in terms of health care, child welfare, violence/crime, special education and suicide deaths. Using secondary data for each category, the aggregate lifetime economic costs of child sexual abuse was approximately \$9.3 billion in 2015 alone.

Massiot et al., (2021) conducted their study keeping the current world scenario in context by inspecting the Impact of the first COVID-19 lockdown on child abuse and neglect in a French Child Advocacy Center (CAC). The authors mainly cited the increase in abuse due to lockdown-induced changes in routine that caused psychological distress. They used data for 1583 children, ranging from the activities that took place in the CAC from March to May 2020: comparing these activities to those in the prior years such as 2018 and 2019. They conducted both quantitative and qualitative approach, using percentages for the former and chi-square or fisher's tests for the latter. They were able to conclude that cases in the CAC were much more severe in 2020 as compared to the prior years.

Moreover, Zhang et al., (2021) used time series data of around 902 US counties from the years 2009-2018 to study the relationship between income inequality and child maltreatment rates, which included maltreatment in the form of physical, psychological, sexual abuse and neglect. They used Gini Coefficient Income Inequality Ratios for measuring the said county-level income inequality. They used Ordinary Least Square Models to estimate the relationship between the two. The results showed that higher maltreatment and abuse was greatly associated with higher Gini Coefficient Index, while the Income Ratios were also associated with overall maltreatment and abuse of children. Oikawa et al., (2022) analyzed empirical evidence from Japan to investigate the relationship between labor market shocks, particularly unemployment, with child maltreatment. They used longitudinal data from 2005-2016 and applied an instrumental variables estimation technique to it. The results showed that a 50% increase in unemployment rates led to an 80% increase in child neglect cases and a 70% increase in child death cases.

While there has been widespread research on the topic of crime against children and its relationship with macroeconomic indicators, majority of the literature that was analyzed was carried out in other areas and countries around the world, like Nepal, South Carolina, France and many others. The literature related to Pakistan remains limited, with research done on aggregated crime data rather than targeting its subsection. Furthermore, the relationship between crime against children specifically females and macroeconomic variables has not been studied yet.

METHODOLOGY

Theoretical Framework

The linkages between crime and economic forces can be dated back to the previous century. The two most important figures that played a key role in laying down the groundwork in establishing a relationship between these two variables are Gary Becker and Isaac Ehrlich. Both provided substantial theoretical evidence to show how criminal behavior can be influenced by the underlying economic conditions. Firstly, Becker (1968) was one of the first few people who introduced the study of crime with economics and laid the foundation of this area of study through his work 'Crime and Punishment: An Economic Approach'. According to the Model provided by Becker, before indulging in criminal behavior, an individual will initially measure the costs and benefits of that criminal activity. They would evaluate these costs and benefits before coming to a decision of whether

they should carry out said activity or not. Considering this, he devised the "supply of functions" approach, which outlines the determinants on why a reasonable individual would commit the crimes that they do.

The model created by Becker (1968) was then expanded by the work of Ehrlich (1973). He elaborates on Becker's model by integrating both punishments and rewards while carrying out both legal and illegal activities. Ehrlich generated a structured connection between different types of crimes and income inequality and techniques of law enforcement. For his analysis, Ehrlich constructed a framework using the economic theory of choice. This theory's foundation lays on the idea that if two actions were mutually exclusive at a particular period, an individual would select between them by weighing the estimated utility associated with each action separately. Another factor that would help make this choice between the legal and illegal activity is the time and the most effective way to allocate their resources.

Creating a simple model by using variables such as i (illegal activity) versus l (legal activity), Ehrlich (1973) measures how an individual will choose between the two; given the success or failure while carrying out i , and employment and unemployment in case of l . He then goes on to describe how an individual might undergo a tradeoff between returns from the two activities by creating the equation " $w_i - w_l$ ", showing the average return differential. They will weigh the returns gained from the illegal activity, versus the wages earned from participating in legal activity in the form of work. Using this equation, he was also to conclude that an increase in w_i will lead to an increase in i and vice versa.

In the context of this paper, Ehrlich (1973) has also provided foundation work by using variables such as labor-force participation and the effects of unemployment on crime. In case of unemployment, a fall in legitimate market opportunities will lead to increase in involuntary unemployment and an increase in income inequality. Although, there may be indication that increase in probability of unemployment influences participation in illegitimate actions, final results were a little uncertain or inconclusive. However, on the other hand, keeping in view the traditional economic theory, labor-force unemployment is a function of income and probability of unemployment. The results of Ehrlich (1973) conclude that labor force participation has a negative relationship with crimes against persons. This means that as wages or income increases, the time spent on carrying out illegal/criminal activities decreases.

While Becker (1968) and Ehrlich (1973) established the groundwork for the research on this field, future researchers have also put forth fruitful contributions. Among these researchers is the work of Berger (2004) who analyzed the income and family structure on child maltreatment risk. The work of Berger can be noted to conclude that families that earn low incomes are at a risk of maltreating their children, exposing them more towards becoming the targets or victims of criminal activities. Moreover, it also provides connections between unemployment rates and maltreatment and neglect. Parents earning low incomes or even unemployed parents are unable to provide security, necessities or the appropriate quality of life for

their children. The work of Becker, Ehrlich and Berger can therefore be used as theoretical background for this paper.

Data and variables

Data description

The below mentioned data for different indicators was collected for the years 2007-2017 from various sources mentioned and was then used to find out the relationship between each of them. A regression analysis was run using the Ordinary Least Square (OLS) Technique on the Empirical Model portrayed in Section 3.3. The approach that the paper will take will be both Econometrics and Descriptive Research. This descriptive research will entail finding the correlations between the macroeconomic variables and

crime against children and providing a detailed analysis on the relationships between them.

Variable description

Total crime rate against female children:

The data for crime against female children in Punjab was collected from Police Station Reports for the years 2007-2017. While the initially collected data was in units of Thousands, it was converted into Rate by using:

$$\frac{(\text{Total Crime against Female Children}) * 100,000}{(\text{Population of Punjab})}$$

Table 1

Description of Total Crime Rate against Female Children

| No | Type of Crime | Description |
|----|-----------------------|---|
| 1. | Murder | The illegal and unlawful killing of a female child who is below the age of 18 |
| 2. | Attempted Murder | The desire but failed attempt at fatally harming or killing of a female child |
| 3. | Trafficking | The illegal exploitation and trading of female children from one place to another. It involves taking children from one area or country and selling them off in another, in exchange of large sums of money |
| 4. | Rape | The forceful and unlawful sexual assault through sexual intercourse of a female minor who is not able to give their consent |
| 5. | Gang Rape | The forceful and unlawful sexual assault through sexual intercourse of a minor who is not able to give their consent by an entire group of people. |
| 6. | Kidnapping | The unlawful act of abducting a female child and holding them as captive. |
| 7. | Kidnapping for Ransom | The unlawful act of abducting a female child and holding them as captive to extract a large sum of money in exchange of the child's release. |

Total Crime Rate against Male Children:

The total crime data against male children was collected from Police Station Reports for the years 2007-2017. The initial data that was in units of Thousands was converted in the Rate:

$$\frac{(\text{Total Crime against Male Children}) * 100,000}{(\text{Population of Punjab})}$$

Table 2

Description of Total Crime Rate against Male Children

| No | Type of Crime | Description |
|----|-----------------------|--|
| 1. | Murder | The illegal and unlawful killing of a male child who is below the age of 18. |
| 2. | Attempted Murder | The desire but failed attempt at fatally harming or killing of a male child. |
| 3. | Kidnapping | The unlawful act of abducting a male child and holding them as captive. |
| 4. | Kidnapping for Ransom | The unlawful act of abducting a male minor and holding them as captive in order to extract a large sum of money in exchange of the child's release. |
| 5. | Rape | The forceful and unlawful sexual assault through sexual intercourse of a male child who is not in a position to give their consent by an entire group of people. |
| 6. | Sodomy | The forced rape of minor boys carried out by other men, done through anal intercourse |
| 7. | Hurt | The unlawful act of harming a child in anyway such as through burning, torture, hair or arm pulling, corporal punishment etc. |

Average Monthly Income:

This will be used as a proxy variable for Income. Average Monthly Income was collected from the Labor Force Survey of Pakistan for the province of Punjab for the years 2007-2017. This proxy variable indicates the mean income that is being earned by both male and female citizens of Punjab monthly, measured in Thousands of Rupees (Anwar et al., 2024).

Education:

The proxy variable that is used for Education is the

Primary School Enrollments in Punjab for the years 2007-2017, and it is measured in Thousands of Enrollments. This indicates the number of children that are being enrolled in the primary level at schools in Punjab.

Unemployment:

This variable is used to measure the overall unemployment rate of Pakistan. This shows the total rate of people who are unemployed as a percentage of the total number of people who are a part of the labor force, which includes both the employed and the unemployed.

Poverty:

To calculate the living standards of people, Poverty Incidence is used as a proxy variable. Poverty Incidence indicates the proportion of people who do not meet the average income levels required to fulfill their basic life necessities and are living below the absolute poverty line without adequate shelter, food, healthcare or education. This data was collected from the published reports of the Economic Survey of Pakistan.

Social Sector Spending:

This variable includes the amount of expenditure carried

out by the Government of Pakistan every year on some of the sectors that have a direct impact on crime rate, namely: Education, Healthcare, Social Security Nets, Criminal Justice and Law & Order. For each year, the amounts of these sectors were summed up to calculate the overall Social Sector Spending for that year, expressed in Billions of Rupees.

Model Specification**Empirical Model (Model 1)**

The following section shows the empirical model, while specifying the dependent and independent variables. Using the data collected from the named sources, a regression was run using the Ordinary Least Square Technique.

Table 3

Empirical Model Specification

| Variable | Proxy | Data Source |
|-------------------------------|---|--|
| Dependent Variable: | | |
| Crime Against Female Children | Total Crime Rate against Female Children (No. of crimes per 100,000) | Police Station Reports |
| Independent Variables: | | |
| Income | Average Monthly Income (Rs. In Thousands) | Pakistan Bureau of Statistics (Labor Force Survey) |
| Education | Number of Primary School Enrollments (000) | Bureau of Statistics Punjab |
| Unemployment | Unemployment Rate % | Pakistan Bureau of Statistics (Labor Force Survey) |

Functional Form of the Model:

$$TCF = f(Y, ED, UN,)$$

According to the above stated model:

Dependent Variable:

TCF - Total crime rate against Female Children

Independent Variable:

Y – Average Monthly Income

ED – Education

UN – Unemployment Rate

Econometric model of the functional form above is:

$$TCF = a_0 - \log \beta_1 Y_t + \log \beta_2 UN_t - \log \beta_3 ED_t + \varepsilon_t$$

Where,

α = Intercept

β = Regression Co-efficient of Variables

ε = Random Error

Y = Average Monthly Income

UN = Unemployment

ED = Education

Descriptive model (Model 2)

This section shows the descriptive model that was used to find the Correlation Matrix that portrayed the relationship between crime and the macroeconomic variables.

Table 4

Descriptive Model Specification

| Variable | Proxy | Data Source |
|--|---|--|
| Total Crime Rate Against Male Children (TCM) | Total Crime Rate against Male Children (No. of crimes per 100,000) | Police Station Reports |
| Poverty | Poverty Incidence (%) | Economic Survey of Pakistan |
| Unemployment | Unemployment Rate (%) | Pakistan Bureau of Statistics (Labor Force Survey) |
| Social Sector Spending | Spending on Education, Health, Social Security & Welfare, Justice Administration and Law & Order (Rs. In Billion) | Economic Survey of Pakistan |

RESULTS & DISCUSSION

This study was carried out using two approaches of research; empirical (econometric) and descriptive, which has further been divided into two parts. The empirical approach was used to obtain a regression model which showed the relationship between the Total Crime against

Female Children (TCF) and Average Monthly Incomes (Y), Education (ED) and Unemployment (UN) by using the OLS Technique for the time series data from 2007-2017. The descriptive approach was used to find out the Correlation Matrix that showed the causal relationship between Total Crime Rate against Children and Poverty (POV), Unemployment Rate (UN) and Social Sector Spending (SSS).

Empirical Results

Table 5

Results of OLS regression (dependent variable: Total Crime Against Female)

| Variable | Coefficient | T-Statistics | P-value |
|----------------|-------------|--------------|---------|
| Average income | -3.535 | 0.1454 | 0.045 |
| Unemployment | 0.139 | .6646 | 0.840 |
| Education | -1.603 | .7155 | 0.060 |
| Constant | 17.26 | 8.006 | .068 |

Source: Author's estimations

Using the data from Model 1, a regression analysis was run using the Ordinary Least Square Technique on time series data from 2007-2017 to find out the relationship between the dependent and independent variables. Log of crime against female children, average income, unemployment and education to make the data linear.

Keeping Total Crime against Female Children (TCF) as the dependent variable and Average Monthly Income as the independent variable, the regression analysis shows a negative relationship between the two. It is statistically significant at a p value of 0.045, and the results show that a 1% increase in the average monthly income led to a 0.353% decrease in the crime rate against female children. This means that as average monthly income increases, crime rate decreases. Much of the previously examined literature also corroborates this relationship, for example, the work of Cui and Hazra (2018) in their study of India, as well as Raissian & Bullinger (2017) that used minimum wages instead of average monthly income like in this study. This relationship that exists can be interpreted from the viewpoints of both the victims and perpetrators of crime.

Firstly, as parents go on to earn a higher income, they are in a much better position to provide for their children. They can give them safety and protection along with also fulfilling their basic life necessities like nutrition, education and healthcare. Moreover, as parents are earning more, there are fewer chances of them neglecting their children out of frustration or stress of financial aspects. On the flip side, as people go on to generally earn higher incomes, few people will participate in criminal activities. This is because they will know that earning through legal means will provide them with higher amounts of money rather than indulging and earning through illegal means such as kidnapping of children for ransoms. Moreover, keeping in view the fear of getting caught and being punished will also push people towards avoiding crime. This relationship can also be corroborated through the work of Becker (1968) who said that when the gains/rewards received from the legal activity will be greater than any gains from the illegal activity, crime will be deterred.

Moving forward, taking TCF as the dependent variable and Education as the independent variable, the results show a negative relationship between the two. It is statistically

significant at a p value of 0.060, and a 1% increase in Education variable results in a 1.60% decrease in the total crime rate against female children. This means that as levels of education increase, crime against female children tends to decrease. These results can be backed in the literature by the work of Atteraya, Ebrahim, and Gnawali (2018). The proxy variable used to measure Education levels were Primary School Enrollments. So, this means that as more young girls get enrolled in schools, they are provided safer conditions for some time during the school hours, and there are fewer opportunities available for perpetrators to indulge in criminal activity. According to a report published by UNICEF in 2019, around 22.8 million children in Pakistan did not attend school, with a large portion of this figure being female children (Shahryar, 2019). This is because families prefer to get the male children educated in hopes of them being in breadwinner of the families in future years. Punjab being a mostly agricultural sector, it is possible that the entire family goes off to work during the day, leaving young girls behind at homes.

This can make them easy targets of abuse by people such as extended families, neighbors etc. who know that the girls are at home alone. Thus, when they get enrolled in schools, they are prevented from being alone and rather spend those hours in school instead, in a much safer space. The negative relationship between education and crime can also be backed by the work of Anwar et al., (2017). The relationship was also greatly studied by Crews (2009), analyzing different perspectives, with one of them being the negative relationship between the two. Regardless of the proxy variable used in this study, as education rises, people become more aware and literate and would generally avoid indulging in criminal activities. Moreover, as people get more educated, they are also likely to earn higher wages due to their increased competence, so they can easily avoid earning through illegal means.

A series of tests were carried out on this to see whether the variables fit the model. Breusch-Pagan / Cook-Weisberg tests were used for heteroskedasticity, whereas the Durbin's alternative test and Breusch-Godfrey LM test were used for autocorrelation, both of which showed there was no serial correlation found in the model.

Descriptive results

Table 6

Correlation Matrix

| | TCM | Poverty | Spending | Unemployment rate |
|-------------------|---------|---------|----------|-------------------|
| TCM | 1.0000 | | | |
| Poverty | 0.2168 | 1.000 | | |
| Spending | -0.2005 | -0.9712 | 1.00000 | |
| Unemployment Rate | 0.4194 | 0.9053 | -0.9010 | 1.000 |

Source: Author's estimation

Firstly, TCM has a negative correlation with Social Sector Spending (SSS). It has a correlation value of -0.2005, which suggests that there is a negative inverse linear relationship between the two. This means that as the SSS increases, the crime rate is going to decrease. This is likely because as the government spends an increased portion of the yearly budget on systems such as Education, Healthcare, Law & Order, Criminal Justice, Safety Nets etc., crime is bound to decrease. Through this spending, when the government starts providing people with ways of getting their rightful justice, criminal behavior against children, and in general will decrease. Since it is believed that perpetrators are rational beings, so when they know the consequences, they will have to face due to their criminal activities, they will automatically be reluctant to indulge in any, since when they get caught, the repercussions in the form of costs will outweigh any incentives or benefits they may receive from carrying out those activities. This can especially work when more spending is done on the training of police forces, courts catering to the needs of the victims with trials being carried out on time and the criminals being given the harshest punishments for the most atrocious of crimes against children. This can be backed up by Gallo (1998) and Becker (1968) who suggest that law-enforcement techniques can play a great role in the deterrence of criminal behavior. Thus, as government spending on such techniques increases, crime against children reduces.

Secondly, TCM has a positive correlation with the Unemployment Rate (UN), with a correlation value of 0.4194, which suggests a direct linear relationship. This means that as unemployment increases, crime against children also increases. These results are in accordance with the studies done by Anwar et al, (2017), Khan, et al, (2015) and Lindo and Schaller (2014). As more and more people find themselves without work, they tend to turn to illegal means for fulfilling their basic needs. These means can come in the form of criminal activities against children such as kidnapping for ransoms and other such activities. Moreover, unemployment for longer periods of times can lead to frustration and stress that can force perpetrators to indulge in criminal behavior such as carrying out rape or murder of children. On the other hand, when parents or guardians face unemployment, they can easily neglect their children due to longer hours of the day being spent looking for work, hence, leaving their children in the hands of acquaintances or neighbors etc. which further exposes children towards being targets of abuse. These results are in correspondence with the study of Gillham, et al., (1998), who measured the relationship between these two variables and found unemployment and physical abuse against children.

Thirdly, TCM has a positive correlation with Poverty, with a correlation value of 0.2168, which shows a direct linear relationship between the two. This relationship was also seen through the studies of McLeigh et al., (2018) and Doidge et al. (2017). Featherstone et al (2019) also in their article used Poverty as an important variable that can cause child abuse and neglect, that can go on to have harmful repercussions for the children. This can be seen from two dimensions. Firstly, when parents have fallen into the deep ends of absolute poverty, they cannot meet the basic needs of their children. This leads to maltreatment in form

of neglect as they are unable to provide basic sustenance in the form of food, health facilities and very importantly, security to their children. Secondly, especially in the cases of homelessness, when parents are unable to provide a stable shelter for their children, the children are then exposed to perpetrators looming around in the society, as they have no protection of any kind, and are out on the streets, leaving them more prone to be the targets of danger and abuse. This can be backed by the research done by Kipke et al. (1997) which concluded that homelessness leads to high risk for youth and children to become victims of criminal activities. Moreover, beggary is an existing profession in Pakistan. Driven by circumstances and poverty, parents usually sell their children for a handful of money, who are then forced into beggary on roads. These children then fall into the hands of all kinds of people that can lead to criminal activities such as child trafficking, murder, rape and sodomy etc. According to studies conducted, beggary in Pakistan is part of Organized Crime that take advantage of people who are forced to be in such adverse conditions and driven by economic inequalities (Azam, 2011).

CONCLUSION

Conclusively, the aim of this paper was to establish that macroeconomic variables and the fluctuations in them can have severe consequences in many areas of the society, crime against children being one of them. After careful review of extensive literature that points toward the same relationship, there is still a need for more research to be carried out in this regard, especially in a country like Pakistan. While a regression analysis was run using crime against female children as the dependent variable and income, education and unemployment as the independent variables; income and education were the only two variables that showed statistically significant results. However, solid predictions cannot be made due to the unreliable nature of the results due to limitations in the availability of the data available on certain variables, especially lack of data available for crime variable. The Correlation Matrix too cannot be used to draw cause and effects and can only help determine a causal relationship. To measure the true nature of unlawful activities towards children, there needs to be reliable data freely available for use so that researchers can use them to build relationships, and only once those relationships are built can they put forward effective policy recommendations for policy makers to implement and deter crime against children.

Conflict of Interests

The authors has declared that no competing interests exist.

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