A Granger Causality Test on the Misery Index Effects on Domestic Violence

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Abstract

This paper investigates the possibility of an increase in domestic violence because of high inflation and unemployment rates in the United States. Inflation and unemployment are two factors that add together to contribute to the Misery Index. This index was created in 1970 by Arthur Okan, who used the index as a measure of economic distress felt by everyday people, due to the risk of, or actual, joblessness combined with an increasing cost of living**.** The data is collected from 1950's to 2019 on factors such as unemployment, inflation, poverty, education, and GDP per capita. The results show that an increase in the misery index causes an increase in domestic violence.

JEL Classification: C12, E31, K4

Keywords: Misery Index, Crime.

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1.0 INTRODUCTION

The Misery Index has been used to study the effects of a variety of variables, such as unemployment and inflation on crime, political election results, weight loss, and happiness. Looking at not only the various areas across the United States, but also on a global scale. This study aims to enhance understanding on the Misery Index effect on domestic violence as annually, 10 million men and women are domestically abused by their partner (*National Statistics*, 2023). From a policy perspective, this analysis is important because it allows them to focus their attention on geographic areas that have low GDP and high inflation within the United States, and can implement economic policy to control inflation rates, while trying to increase GDP to decrease the amount of domestic violence year to year in the United States. The relevance of this study is that it looks at domestic violence on a national level year to year, to evaluate what the correlation is of having a high inflation rate, low education, low GDP, high poverty, contributes to higher levels of domestic violence within intimate partner relationships.

While the Misery Index is an economic tool that can be used to look at macroeconomic issues, it cannot directly look at social issues like domestic violence, or overall violence as a sole indicator of correlation. Even though historically, an increase in the Misery Index is shown to be linked to an increase in overall violence, from economic distress, other social factors affect the rate of domestic violence. Yet, an increase of inflation and unemployment can exacerbate the issue of domestic violence. As an increase in Misery can cause financial stress, unemployment, limited resources, mental health problems, and social isolations.

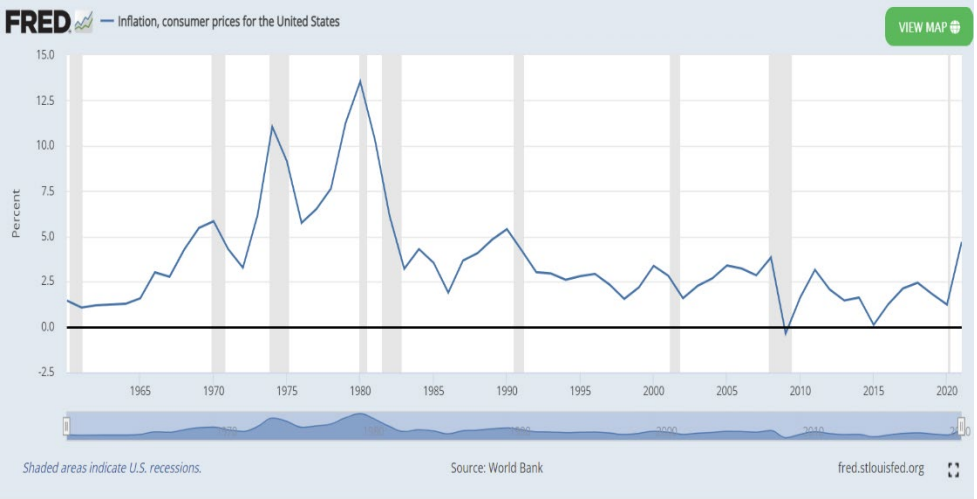
This study aims to investigate whether or not Saboor et al. (2016) thesis, that domestic country face more of a long run effect on domestic violence, was the same conclusion for a country like Pakistan, as it is in the United States. While utilizing annual data from the year 1965-2020, there was shown causality between inflation and the effect of domestic violence in the long run. In the short run, both inflation and GDP contribute to domestic violence. This result was found from running a unit root, Johansson co-integration, and Granger Causality test.

This paper was guided by three research objectives that differ from other studies: First, it investigates the possibility of interdependence between domestic violence and the Misery Index. Second, it incorporates the Misery Index into a model to exam how the independent variables of poverty, GDP, inflation, and education affect domestic violence levels. Last, it analyzes the misery index on domestic violence using a panel data model. The rest of the paper is organized as follows: Section two gives a brief literature review. Section three outlines the empirical model. Data and estimation methodology are discussed in section four. Finally, section five presents and discusses the empirical results. This is followed by a conclusion in section six.

2.0 TREND of Misery and Domestic Violence

Figure 1 shows in the inflation rate from 1965 to 2020 for the United States. Inflation is measured in this instance by the cost of consumer prices. The consumer price index (CPI) is a basket of goods such as food, housing, transportation, and recreation, that shows the average cost of goods for that period. The inflation rates have hit peaks and troughs over the past 60+ years.

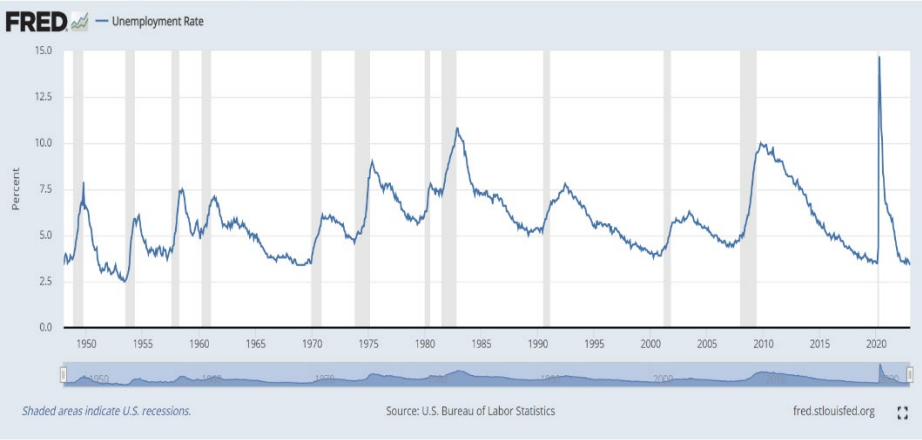
Figure 1: Inflation, consumer prices for the United States



Source: FRED, World Bank

Figure 2 shows the United States' unemployment rate from 1960 to 2020. Unemployment and inflation are added together to create the Misery Index. In 202 Unemployment hit a record breaking 60 years high, even during the 2008-2009 recession, the percentage of US citizens unemployed never came close to the 15% level it reached in 2020 due to COVID-19. This effect may have had a strong correlation to the level of domestic violence as the Misery Index also accounted for growing inflation.

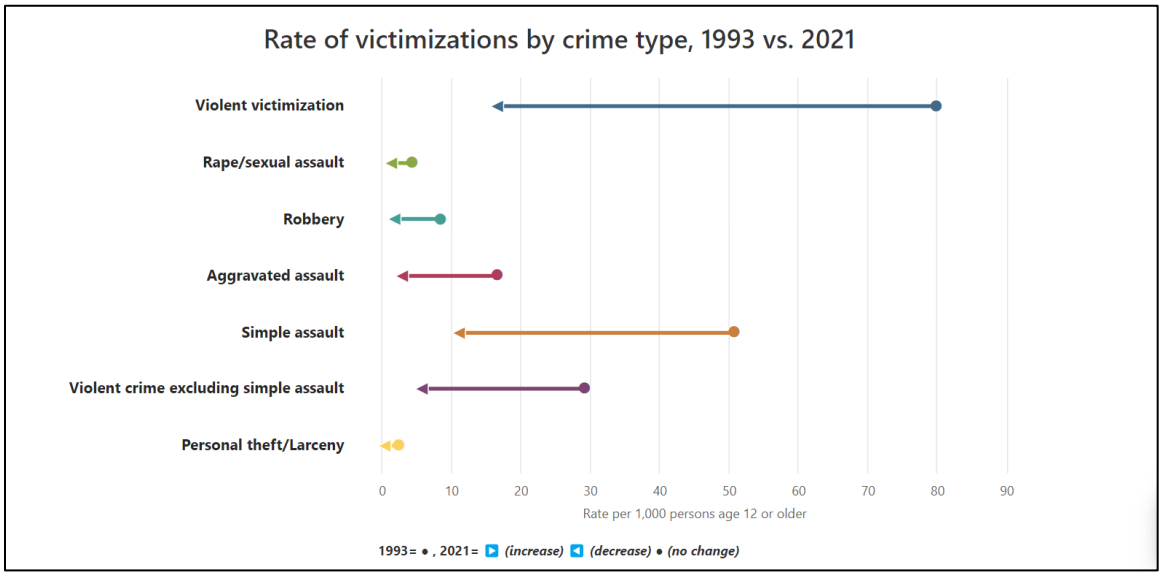
Figure 2: United States Unemployment Rate



Source: FRED, US Bureau of Labor Statistics

Figure 3 shows the rate of domestic violence victimizations by crime type. The data is based on a change from 1993 to 2021, either having an increase, decrease, or no change in domestic violence during the past thirty years. Violent victimization, rape, assault, robbery, and theft have all had a decrease. Violent victimization decreased over 60%. Despite 2020 having a major economic crisis, with high rates of inflation and unemployment, the level of crime compared to 1993, during the start of the Tech Bubble, was still higher in 1990's compared to present levels of crime.

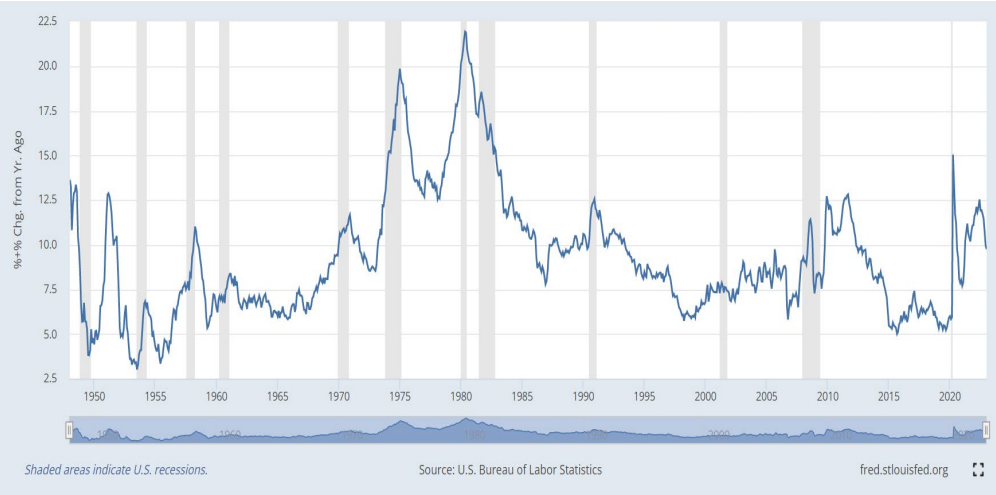
Figure 3: Rate of Victimizations by Crime Type, 1993 vs 2021



Source: Bureau of Justice Statistics

Figure 4 shows the Misery Index based on unemployment rate and consumer price index for all urban consumers. All items are from a US city average. The Consumer Price Index for All Urban Consumers: All Items is a price index of a basket of goods and services paid by urban consumers. Percent changes in the price index measure the inflation rate between any two time periods. The most common inflation metric is the percent change from one year ago. It can also represent the buying habits of urban consumers. This index includes roughly 88 percent of the total population, accounting for wage earners, clerical workers, technical workers, self-employed, short-term workers, unemployed, retirees, and those not in the labor force.

Figure 4: Misery Index 1960 to 2023



Source: FRED, Bureau of Labor Statistics

3.0 LITERATURE REVIEW

In a study by Açcı and Çuhadar(2021), it was found that crime has historically been a subject matter for social sciences. Economics has begun its study on crime starting with a person's intensity to commit crime based on microeconomic theories, however, in recent years the misery index has linked crime to inflation and unemployment rates. The model used the prison population per 100,000 inhabitants as the dependent variable, and the misery index, GDP, poverty, and education for the independent variables in the model. Data from the World Bank, UNDP, University of Oxford, and UNODC helped create a reliable data set. This study analyzed the 'Fragile Five' in relation to the misery index, that is Indonesia, Turkey, Brazil, India, and South Africa. It was found that increases of the misery index from 2004-2017 have increased crime.

Research on the Misery Index has been used to track crime rates in various countries. In Nigeria, institutional quality, from government, and laws, was found to reduce crime rates in the short term in Nigeria, however long-term economic misery was shown to have an increase in crime. Connecting the social sciences, which advocate for government reforms for developing countries to be able to create more peaceful conditions for citizens in various countries. It was also established in this study that democratic nations such as Nigeria, were subject to more fluctuation in crime rates due to the democratic political system (Folorunsho and Ajide 2019).

In Iran from 1971 to 2008, Piraee and Barzegar (2011) used a parsimony model to fix the issues of multicollinearity of independent variables and the effects of issues with the standard crime function. After the F-test was run, it was found that misery index correlated with bribery, robbery, embezzlement, and fraud in the country of Iran. There was causality between murder, bribes, fraud, and the misery index. Showing the power of inflation and unemployment in various countries and its effect on various forms of crime. Tang and Lean (2009) used the same parsimony model to show the problems with the crime function. They used their model to look at the overall crime rates in the United States from 1960 to 2005.

Saboor et. al (2017) notice how increases in inflation and unemployment have increased crimes mostly in democratic countries for decades. Pakistan is a democratic nation, that holds elected officials as well as a parliamentary system. The author

corrected the crime model with Pasaran's conditional error correction model. Unlike other researchers that noted effects of misery to be in the short term, these authors found a long run relationship between misery and crime. They showed that in democratic regimes, people are three times more likely to be miserable, from inflation and unemployment, than countries in a dictatorship.

The misery index has been used to measure overall violence in various countries. It can also be used to measure the relationship with specific forms of violence, such as domestic violence. Domestic violence is a concern for not only women but males in the United States. The National Coalition Against Domestic Violence (*National Statistics*, 2023) has published statistics on domestic violence such as in the United States every ten minutes someone will be faced with a domestic violence assault. This is the equivalent to 10 million men and women each year. Domestic violence is broken down into rape, stalking, homicide, children, and mental/emotional.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses annual data in a time series from 1960 to 2021. The data was obtained from FRED to find yearly unemployment, LGDP, and inflation. The average year of education is found from the Human Development Index. Poverty levels annually were obtained from the World Bank. Domestic violence data was taken from the US Department of Justice on percentage of crimes per 100,000 individuals. The Misery Index is calculated from annual inflation and unemployment but ran as separate variables for the purpose of showing causality between variables.

4.2 Empirical Model

Following the model taken by Açcı and Çuhadar (2021) and Saboor et al. (2016) of the relationship between Misery Index and crime is as follows:

$$\Delta lcrime_{i,t} = \gamma 1 \Delta lcrime_{i,(t-1)} + \beta\, 1 \Delta miser y_{i,t} + \Delta lcrime_{i,t} = \gamma\, 2 \Delta lcrime_{i,(t-1)} + \beta 12\ \Delta unemployment_{i,t} + \beta 22\ \Delta inflation_{i,t} + \beta 32 \Delta educ_{,t}\ \delta 2 \Delta Zi_{,t} + \Delta \varepsilon i_{,t}$$

In this study, I adapted and modified crime, for a specific crime type, that being domestic violence. Thus, my model could be written as follow:

$$\textbf{Domestic Violence} = \beta 0 + \beta \Delta \textbf{unemployment}_i + \beta 2\ \Delta \textbf{inflation}_i + \beta 3\textbf{poverty} + \beta 4\textbf{Edu} + \beta 5\textbf{lgdp} + \Delta \varepsilon_i,$$

$$(MI = U + I)\ (1)$$

Domestic violence is the annual percentage of crime victimization domestic case per year. Domestic violence is used as an endogenous variable, which is determined by unemployment, inflation, poverty, education, and GDP, in this instance. The independent variables used in this study consist of five variables obtained from various sources. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the variables. Unemployment is the percentage of the total labor force. Inflation is the annual percentage of increase in consumer prices. Educ is the average years of schooling in the United States from kindergarten to doctorate levels. Poverty is the rate of those making under $5.50 USD a day. LGDP is the logarithm of GDP per capita, PPP (current international $).

5.0 EMPIRICAL RESULTS

A Granger causality test is used to test whether one time series "causes" another time series. This is a key difference between running a regression, as regressions show how correlated two or more variables are, but not causal. In econometrics, one cannot use a linear regression for time series data, as a time series is an attempt to predict the future relationships between variables that are not linear. Although there are various methods to analyze time series data, I followed the empirical model of my research paper, which used a Granger Causality test. To run a Granger Causality test, an Augmented-Dicky Fuller Test, which shows if a unit root is present in the model, and a Johansen Unit Root Test is conducted. The unit root test shows whether the independent variables effect on the dependent variable is stationary. Meaning that mean and variance do not change over time. The Granger Causality test shows no causality between inflation, poverty, education, and unemployment, on its effectiveness on domestic violence. This means that in the short run there was an effect of both inflation and unemployment rate on domestic

violence. However, this was not granger causality for more than one time series, using two lags.

Table 1: Results of Augmented-Dicky Fuller Test

Variable	Prob	Obs	Significance
EDU	0.0000	50	
INFLATION	0.0001	50	**
GDP	0.0000	50	
POVERTY	0.0000	50	
UNRATE	0.0139	50	**
VIOLENCE	0.0144	50	**

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% Respectively

Source: Author's Calculations

As shown in Table 1: The ADF test is used to determine the presence of a unit root in the time series. Inflation and unemployment rate, which make up the Misery Index, were stationary for the time series at 5% confidence. Meaning, there was no unit root present in this data. The mean, variance, and autocorrelation remained constant throughout the lags.

Table 2: Results of Johansen Cointegration Test

Variable	λTrace	λMax
EDU	122.6174	43.99849
INFLATION	78.61888**	38.76601**
GDP	39.85286	19.03482
POVERTY	20.81805	13.83026
UNRATE	6.987788	6.164942
VIOLENCE	0.822846	0.822846

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively

Source: Author's Calculation

As shown in Table 2, inflation was the only variable that was statically cointegrated. Showing that over the long run inflation affects domestic violence.

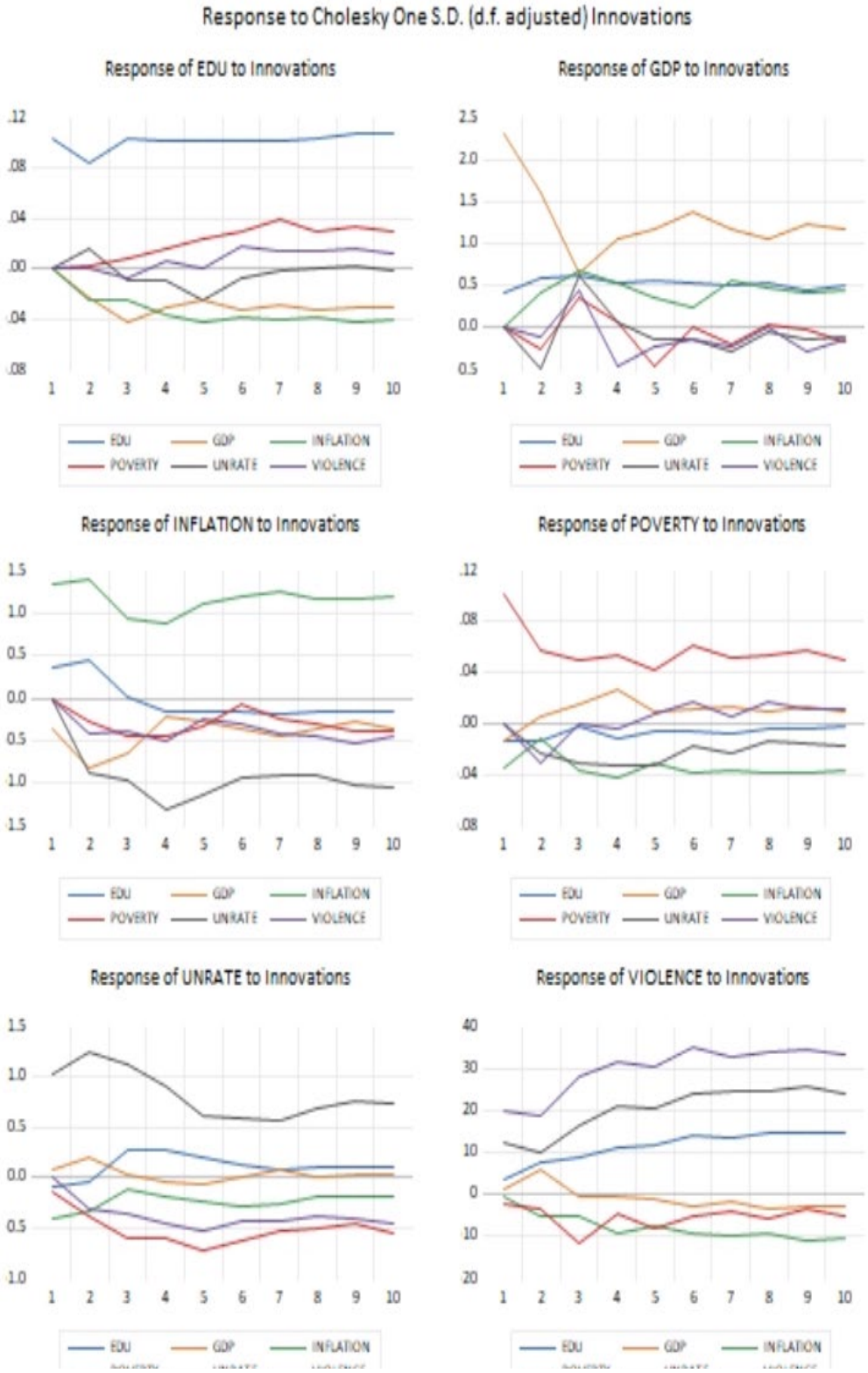
Table 3: Results of Granger Causality Test

Variable	Cause Violence	F-test	P-value
EDU	No	3.32455	0.0452
INFLATION	No	1.11746	0.3362
GDP	No	4.20439	0.0213
POVERTY	No	0.08022	0.9230
UNRATE	NO	0.45141	0.6396

Source: Author's Calculation

Folorunsho M. Ajide (2019) stated that long term economic misery correlated to increases in crime, this held true for economic misery caused by inflation. In table 3, the empirical results suggest that we fail to Granger-cause on edu, inflation, poverty, and unemployment, showing in the US these variables are not useful for forecasting crime in the long run.

Table 4: Impulse Response for Independent Variables



Source: Eviews

The impulse response functions as shown in table 4 show the effect on each independent variable on domestic violence. This is the response to Cholesky one standard deviation adjusted by the independent variable, and how the response controls itself overtime. As you can see, the impact of an increase in education on domestic violence is Negative. The more education one has, the less domestic violence. An increase in the unemployment rate and domestic violence is shown to be positive. As more unemployment creates more stress, and more blame on the other partner. It also leaves more time for domestic abuse to occur. The effect of one standard deviation on poverty as well as inflation is also positive, as for the same reasons along with unemployment. Stress about money creates more violent tendencies, as well as those who are in areas with high poverty in the United States probably have less access to resources, less education on domestic violence, and less police protection.

5.1 POLICY IMPLICATIONS

Inflation and unemployment were statistically significant in showing that there is enough data to prove these variables are correlated to domestic violence in the long term, but do not directly cause one another. Economic instability can lead to crime, with the association of other factors that may cause domestic violence, i.e., mental health, alcoholism, or drug abuse from poor economic outcomes. If the FED creates better monetary policy decisions as well as utilize more monetary policy tools like quantitative easing or tightening, and raising the federal funds rate, it can affect the amount of inflation and unemployment overall. Policy makers can also work to provide better job placement programs for those who are in poverty, provide continual government support such as SNAP benefits, low-income housing, better education for children in poverty-stricken areas, this can all contribute to change in the rates of domestic violence when just considering the independent variables within this study.

5.2 LIMITATIONS OF STUDY

Limitations of the study include this analysis only being run with country specific data over many years. If I had used state specific data, I might have been able to identify a difference among states, in various regions, and how inflation and unemployment, which makes up the misery index, might have more of an effect on domestic violence more than

other states. I also believe that some areas may be more prone to higher domestic violence rates due to other factors, and overall crime rates being high in specific states. If factors such as poverty are more prevalent in some areas, it could already be a basis for more domestic violence. I also think that state specific analysis could be broken into doing an urban vs rural analysis to see if in major cities domestic violence is higher because of the effect of the misery index. Lastly, within my research I ran my Granger causality test with the Misery index data as two separate variables, inflation, and unemployment. If I ran these variables together and added other variables into the model, it could change the overall causality results.

5.3 CONCLUSION

This study showed that in the long run, there is no causality between violence and the independent variables, at least in the United States. Using time series annual data, Granger causality tests were conducted, after an ADF and Unit Root test were done. The objective was to determine whether the Misery Index caused an increase in domestic violence, which it did not. In summary, based on the results, the study goes against the hypothesis based on prior literature for other countries, especially Saburo et. al (2017), that stated in democratic regimes, people are three times more likely to be miserable, from inflation and unemployment, than countries in a dictatorship. In the United States this was not true as a nation overall. This may be because of current monetary policy and other fiscal policy that helps citizens, compared to countries such as Pakistan, which although may be democratic, may not have the same social and economic standards as the United States, which lowers the rate of domestic violence.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
MI	Misery Index calculated from annual unemployment and inflation	FRED
LDGP	The logarithm of GDP per capita, PPP (current international $)	FRED
POV	Percent of 100,000 under $5.50 USD wage	World Bank
I	Inflation – Consumer Prices (annual %)	FRED
UN	Unemployment Rate total (% of the total labor force)	FRED
Crimel	Rate of domestic violence per 100,000	US Department of Justice
EDU	Average rate of education	Human Development Index

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