

# Impact of Male Socio-Economic Factors on Crimes Against Women

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## Abstract

The authors attempt to analyse the determinants of crime against women, with an emphasis on male factors. The paper attempts to empirically analyse various theories that affect attributes like Gross Enrolment Ratio, Unemployment, and Per Capita Income on the rate of crimes against women. The analysis is done using panel data of 15 Indian states for a period of 2 years. It tests whether there is a significant relationship between the factors listed above and the crime rate, and further analyses the reasoning for the positive or negative associations with crimes against women. Three important results emerge. First, there exists a negative association between the gross enrolment ratio and crimes against women in India. Second, unemployment and per capita income have a positive association with crimes against women. By highlighting men's impact on major aspects of crimes against women, this paper captures the influence that gender mainstreaming of policy can improve the safety of women.

**JEL Classification:** B54, C51

**Keywords:** Crimes against women, male socio-economic factors, gender mainstreaming

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## 1 Introduction

Across the Indian subcontinent, gender inequality, and its resultant biases has led to unequal opportunities and poor living standards. This disparity is observed at all income levels, ages, and social classes. Due to this, the men and women often lead significantly contrasting lives in India—which thus leads to disparity in the levels of power and authority – women are often discouraged from pursuing any careers, and have to spend many hours in the day engaged in unpaid care work, while men are actively encouraged to participate in economic activity. Moreover, at the household level and beyond, women who exert little to no power may often be subject to violence and abuse.

According to the Declaration on the elimination of Violence Against Women by the United Nations, the term ‘violence against women’ is described as an act of gender-based violence that results in or is likely to result in physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life. (Declaration on the Elimination of Violence against Women, 1993).

Violence against women is a widespread problem in India. A 2011 survey reported that 20 Indian men admit to forcing their wives or partners to engage in sexual intercourse, 24 Indian men had committed sexual violence at some point during their lives, and 38 men admit they have physically abused their partners. Moreover, in many instances, these crimes go unreported for reasons that range from social stigmas to familial pressure.

The majority of cases under crimes against women out of total Indian Penal Code (IPC) crimes against women<sup>1</sup> were registered under ‘Cruelty by Husband or His Relatives’ (31.9%) followed by ‘Assault on Women with Intent to Outrage her Modesty’ (27.6%), ‘Kidnapping Abduction of Women’ (22.5%) and ‘Rape’ (10.3%) (Tiwary 2020).

Power dynamics play a crucial role in creating imbalances wherein women are dependent on the men of their family for a livelihood, which is substantiated by the theory of male chauvinism. Furthermore, women are made to feel insecure, incomplete, ineffective, and inefficient without males. Based on this, the male is regarded as the dominant while the female is expected to be docile – which enables men to be able to exploit women (Niaz, 2003). Thus, these power imbalances exacerbate instances of crimes against women.

WHO estimates that nearly 1 in 3 women worldwide face either physical and sexual intimate partner violence or non-partner sexual violence in their lifetime (Violence against women Prevalence Estimates, 2018). In India, over 16 women out of every 100 thousand are sufferers of domestic violence. According to National Crime Records Bureau (NCRB) data, domestic violence holds the largest share in total crimes against women, even though these cases primarily go unreported. As per the data, 89,097 cases related to crimes against women were registered across India in 2018. The figures indicate not much has improved when compared to the figure of 86,001 cases reported under this head in 2017. However, despite

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<sup>1</sup>See appendix for detailed list of crimes that are considered under the umbrella of crimes against women.

an increase of 1.3 per cent in the registration of cases in 2018 over 2017 with 50,07,044 cases, the crime rate per lakh population has declined from 388.6 in 2017 to 383.5 in 2018 (Jain, 2020); implying that as more women feel less reluctant to report their crime with time the whole pie like crime rates structure shrinks even though the portion/slice of reported (not actual) crime increases

Crime and economics have a defined relation. The former imposes economic and monetary costs on individuals and society, creating insecurity and propagating a sense of fear, thereby setting psychological expenses (Zhen Cui and Devika Hazra, 2017). For policy-making directed towards curbing crime, it is imperative to understand the factors — social, demographic, socioeconomic, or macroeconomic — that influence crime in a society. Further, individual characteristics such as demographic data of age and education, interpersonal and community contexts impact crime. (Capaldi et al., 2012; Ellsberg & Heise, 2005; Michau, Horn, Bank, Dutt & Zimmerman, 2015).

In this paper, the authors have attempted to model and understand the different male socioeconomic factors which may lead to crimes against women and have drawn conclusions regarding whether and how factors such as enrolment ratios, employment, and per capita income affect crimes against women.

Our paper is structured in the following manner: Section 2 entails our review of the existing literature, and Section 3 expands on the data and methodology used. In Section 4 we present and discuss the econometric model and estimations of our research. We have compiled our analysis and results in Section 5 and Section 6 provides the scope for further research. We conclude our paper in Section 7.

## 2 Literature Review

There is extensive literature on the nature of the relationships that exist between crime and economic indicators. Theoretical studies have predicted both positive and negative associations of crime with economic activities. These theories, along with the sociological General Strain Theory (GST), state that certain strains or stressors, derived from factors such as lack of income or lack of quality education, increase the likelihood of individuals committing a crime. It explains the influence that these variables may have on crimes against women (Kaufman, 2009).

Additionally, the Resource Theory (Goode, 1971) argues that emerging gender equality creates challenges to the entitlements and power that patriarchy provides to men, such as when women begin to gain employment outside the home and have greater access to financial resources, or when women have higher educational attainment than men. Some men respond to these challenges by exerting their dominance via physical violence in the form of domestic violence or sexual assault. This theory shows that it is not all men under patriarchy who perpetrate violence, but rather men who feel that their dominance is threatened in personal relationships (K. L. Anderson, 1997; Basile, Hall, & Walters, 2013; Choi, Cheung, Cheung, & David, 2014; Mason et al., 2008; Moe & Bell, 2004). When patriarchy fails to give men the power they feel they deserve in relationships, they then resort to violence to gain the

upper hand. Thus, the existence of the patriarchal system enforces an environment where women have next to no control of their social setting.

One widely investigated prediction of resource theory is that male partner with lower resources are more likely to become Intimate Partner Violence (IPV) perpetrators. The report gathered that insufficient resources are associated with a higher prevalence of violence at the individual level, i.e., for either partner in the relationship and at the household level. In the considerable empirical literature investigating this idea, the evidence is generally supportive. (Bettio & Ticci, 2017)

Unemployment and income can have both positive and negative associations with crime rates, which can be observed in the Cantor and Land (1985) model. This model suggests that the effect of unemployment on crime results from two opposing pathways. The first is the motivational effect which states that as a population's economic conditions begin to deteriorate, i.e., there are inadequate jobs and incomes, it leads to an increased level of criminal motivation within that population. The second is the opportunity effect, which states that as a result of deteriorating economic conditions, individuals find themselves in routine, home-based activities, and in the short run, have reduced access to public spaces and exposure to social interaction, thereby resulting in a reduced opportunity for crime to be committed.

Considering both these studies together, it implies that when the pathway of motivation dominates opportunity, there is a positive association between crimes against women and unemployment and income and a negative association when the pathway of opportunity dominates motivation.

Adding to this, the Social Disorganization Theory establishes links between violent crimes in urban areas and lower economic status. According to this, growth in urban areas leads to the physical, economic, and social decline of residential areas close to the central business districts, which draws migration of poorer individuals. As a result of this process, areas with a low average socioeconomic status will also have higher residential instability, which in turn will create social disorganization (Bursik and Gasmick, 1993). This social disorganization can reduce social capital and the ability of members of a community to control the behaviour of individuals and groups within the community. Losing control of people's behaviour prevents residents from creating a safe and orderly community, and thereby increases rates of crime and violence. It is important to note that these processes that link poverty with population turnover are specific to urban settings. In rural settings, poor populations may be stable, and the link between economic status and crime may break down.

Further, there are many theories that support a negative relationship between education and crime. First, education increases the opportunity cost of crime and the cost of time potentially spent in prison. Further, education may also make individuals more risk-averse, further reducing the propensity to commit crimes. Lastly, education exposes individuals to stereotypes and inequalities and provides an avenue for discussing gender roles. Education also helps in providing a rational space to understand and develop positive attitudes, helping

further reduce and disincentivize crimes against women.

We believe that this paper uniquely contributes to the intersecting field of economics and gender in two ways. First, it employs an intensive panel data analysis on the rate of crimes against women and other variables. Second, it opts for a unique analysis through a gendered lens, which focuses primarily on the impact of male factors and their influence on the rate of crimes against women.

### 3 Data and Methodology

The paper uses state-wise secondary data available from various government sources taken for two years – 2017 & 2018, as listed in the table below. Data for 15 Indian states has been taken on four variables: Crimes Against Women, Per Capita Income, Male Unemployment & Male Gross Enrollment Ratio.

To compensate for data inconsistencies, specific demographic and economic indicators have been selected based on the literature review to understand better the rationale behind including the Gross Enrollment Ratio of Males, Weighted Average Unemployment Rate of Males and Per Capita Income as explanatory variables.

Before proceeding further, it is essential to note that survey evidence reports that Crimes Against Women (including domestic violence, sexual assault, sexual harassment, eve-teasing, and stalking) are typically under-reported. This is further established in the National Family Health Survey (NFHS) – 5's data. The United Nations estimates that 1 in 3 women worldwide have experienced sexual or physical violence in their lifetime. Additionally, marital rape, although morally considered a crime, has not been criminalized under Indian Law. Underreporting of crime occurs due to various reasons, such as embarrassment, financial dependency, fear of retaliation, victim-blaming, low conviction rates, and a tedious and painfully slow bureaucratic procedure. Determining the extent of this underreporting is helpful to conclude the difference between the incidence of violence against women and reporting of violence against women. Using NCRB data is reliable, as it prevents the inclusion of false reports and provides annual data. However, it leads to underreported crime, affecting the data quality and making the available data incomplete, adversely impacting the quantitative study.

Crime Rate against women is the dependent variable that specific indicators mentioned above shall be explained in their relationship with the former. Crime Rate has been taken as a sum of reported incidents under IPC (Indian Penal Code) and SLL (Special and Local Laws)<sup>2</sup>. While Crimes Against women are influenced by various socio-demographic, political, cultural, economic, and legal factors, one binding or critical issue is the perpetrators of these crimes, who are overwhelmingly men. Further, the IPC recognizes rape as an act that can be committed only by a man.

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<sup>2</sup>See Appendix for detailed explanation

**Table 1: Description of Data Sources**

<b>Data</b>	<b>Classification</b>	<b>Sources</b>
Crime Rate	Dependent	National Crime Records Bureau
Gross Enrolment Ratio of Males	Independent	Ministry of Human Resource Development
Weighted Average Unemployment Rate of Males	Independent	Reserve Bank of India
Per Capita Income	Independent	Economic Statistical Organization Punjab; Central Statistical Organization, New Delhi
Rural-Urban Composition	For Calculation Purposes	Census India, Provisional Population Tools

*Source:* Authors' descriptions.

A brief discussion of various attributes is given below.

**Table 2 : Description of The Variables**

<b>Conceptual Variable</b>	<b>Measurable Variable</b>	<b>Variable</b>	<b>Description</b>
Crimes Against Women	Reported Rate of Crimes Against Women	CAW	The crime rate of (reported) violence against women calculated as a crime per one lakh of population in states $i$
Male Education	Gross Enrolment Ratio of Males	GER	Gross Enrolment Ratio of Males in states $i$
Unemployment of men	Weighted Average Unemployment Rate of Males	UNEM	Weighted Average Unemployment Rate of Males in states $i$
income	Per Capita Income	PCI	Per Capita Income (NSDP) at current year prices in states $i$

*Source:* Authors' descriptions.

The Descriptive Statistics for the data are given as follows:

**Table 3 : Descriptive Statistics**

	CAW	GER	UNEM	PCI
<b>Mean</b>	74.92	26.54	57.27	126291.1
<b>Median</b>	65.65	24.2	54.39	99512.5
<b>Standard Deviation</b>	31.24	6.804	24.46	53488.99
<b>Minimum</b>	35.6	18.1	0	56861
<b>Maximum</b>	177.8	769.8	145.66	226409

*Source:* Authors' calculations.

## 4 Econometric Model and Estimation Methods

To understand the impact of male socio economic factors on crimes against women, we hypothesize that education and per capita income have a negative relationship with crimes against women – that is, an increase in the value of these variables will decrease the value of the crimes against women, and unemployment will have a positive relationship with crimes against women – that is, higher unemployment rates for men will increase crimes against women. The econometric model used in this paper takes the form given in Equation (1) below:

$$\ln(CAW)_i = \beta_0 + \beta_1 GER_i + \beta_2 UNEM_i + \beta_3 PCI_i + u_i \quad (1)$$

Cross-sectional data for fifteen states is taken over the period of two time periods - 2017 & 2018. The effect of 3 variables: Gross Enrolment Ratio of Males, Weighted Average Unemployment Rate of Males<sup>3</sup>, and Per Capita Income have been taken as explanatory variables, and their effect on the natural log of Crimes Against Women, has been estimated.

The estimation methods which have been used in this study are Pooled OLS estimation, Fixed Effects estimation and Random Effects. The econometric model given in equation (1) has been estimated by all three estimation methods. The decision regarding the most appropriate estimation method has been made based on the Hausman test, and Breusch-Pagan Lagrange Multiplier test.

From the results of these tests, we concluded that the estimation of the random effects would provide consistent results for the study.

<sup>3</sup>The Unemployment Rates of States have been estimated based on the weighted average of Urban and Rural Unemployment Rates, taking the percentage share of each state's total population by residence based on 2011's Census.

## 5 Results Analysis

Table 4: Results of the Regression (Pooled OLS Regression)

Independent Variable	Coefficient (Pooled OLS)	Coefficient (Fixed Effects)	Coefficient (Random Effects)	Coefficient (Random Effects) <sup>4</sup>
Intercept	4.2738*** (13.2426)	-	4.2217*** [13.4211]	4.2217*** (19.0626)
GER	-0.033347* (-2.2726)	-0.0035112 (-1.5512)	-0.03295* [-2.3099]	-0.03295** (-3.3948)
UNEM	0.0064718* (2.4395)	0.0091084* (2.2892)	0.0068983** [2.6310]	0.0068983** (3.7071)
PCI	0.00000396 (2.0291)	0.0000047330 (1.5314)	0.0000038096* [2.1169]	0.0000038096** (3.3560)
R Square	0.31038	0.45268	0.40588	
Adjusted R Square	0.22418	-0.47777	0.33162	

*Source:* Authors' calculations.

*Notes:* ( ) - t values; [ ] - z values

Significance codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

In this section, the results based on the Pooled OLS, Fixed Effects and Random Effects estimation methods are presented. Based on the results of our tests namely: the F-test, Hausmantest, and the Breusch-Pagan Lagrange Multiplier test, correct estimation method(s) have been determined. Table 4 shows the results of various panel data regression models.

As concluded from the diagnostic tests, the random effects estimation method provides for the most consistent results - hence, the discussion of the regression results will be based on the results of the Random Effects Estimation. In this analysis, all explanatory variables considered in the study – that is, Gross Enrolment Ratio, Per Capita Income and Unemployment Rates have a significant impact on Crimes Against Women.

We further tested the estimated model for the three assumptions of OLS - homoscedasticity, the absence of autocorrelation & multicollinearity.

Multicollinearity was diagnosed by calculating the Variance Inflation Factors for the explanatory variables – as all VIF values ranged between 1-2 - we thus concluded the presence of low multicollinearity in the model. We conducted the Breusch-Godfrey test to diagnose autocorrelation, and thereby concluded that no autocorrelation was present among the estimators. We also tested the data for homoscedasticity using the Breusch-Pagan test and concluded that heteroscedasticity was present in the model. The model was hence corrected for heteroscedasticity and has been presented in table 4. The results of diagnostic tests have been provided in the appendix to this paper.

We find that Gross Enrolment Ratio, Weighted Unemployment and Per Capita Income are significant at a 99% significance level. Further, Gross Enrolment Ratio has a negative rela-

tionship, and Weighted Unemployment and Per Capita Income have a positive relationship.

Subsequently, the result of the Gross Enrolment Ratio of men (GER) supports the theory that an increase in education reduces the rate of Crime Against Women. The negative sign of the coefficient signifies this inverse relationship. This implies that education exposes individuals to discussing gender roles, stereotypes, and inequalities, and helps in providing a rational space to understand and develop positive attitudes. It also implies that an increase in education increases the opportunity cost of crime and the cost of time potentially spent in prison. Hence, an increase in education acts as a deterrent and helps in reducing Crimes Against Women.

Unemployment is positively related to crime against women, which implies that an increase in the weighted unemployment of men leads to an increase in crime against women. This result supports the motivation effect, implying that low levels of employment result in an increased level of criminal motivation within that population, and an increased level of crime.

Per Capita Income, too, is positively related to crime against women, which means an increase in income leads to an increase in crime. There are a few possible explanations for this result. The first is that since this variable is not gender-specific, i.e, it is not determined just by male income, but by all incomes, it could be that an increase in income empowers individuals with greater social capital and legal options, which could lead to an increase in the reporting of crimes against women. Secondly, Social Disorganization Theory is known to not hold in rural areas and considering that the Indian population majorly lives in rural areas, and the data of Per Capita Income is aggregated for the population as a whole (it is not segregated into rural and urban), the effect of the rural indicator may dominate the urban indicator, resulting in the data not supporting the Social Disorganization Theory.

## 6 Scope for Further Research

The paper tries to measure the impact of male factors on crimes against women. This research can be enhanced by checking the impact of these factors on not just women, but also on gender minorities. Further research can be done by taking different indicators of these factors, with intersections of other social, cultural, and legal factors into account, such as conviction rates, reporting rates, effects of alcohol consumption, marriage, etc. to check the relationship between men and crimes against women. Further, potential studies can attempt to quantify the effect of the abstract structure of patriarchy on various indicators of women empowerment. There is an essential requirement to research and further understand the impact such factors can have on women and gender minorities, not only to reduce the impacts of gendered crime but also to frame policies and laws that can help uplift and empower them.

Moreover, this study takes into account two years' worth of data on these factors due to the unavailability of appropriate data sets. However, the study can be further enhanced to get more accurate results if a larger panel of data is considered.

## 7 Conclusion

This paper recognizes that Crimes Against Women are influenced by various socio-demographic, cultural, economic, and legal factors such as GER, HH, PCI, CAW. Through extensive empirical research, one binding or critical issue identified that the perpetrators of these crimes are overwhelmingly men. To examine and model the association of crimes against women and men-related economic factors, namely Gross Enrolment Ratio, Unemployment, Per Capita Income, and Sex Ratio.

Upon interpretation, the authors found that Gross Enrolment Ratio, Weighted Unemployment, and Per Capita Income have a significant impact, while the Sex Ratio of states has an insignificant impact. In terms of relationship, the analysis depicts that Gross Enrolment Ratio is the only variable that is negatively related to Crimes Against Women. The remaining variables, i.e., Unemployment, Per Capita Income, and Sex Ratio, are positively related to Crimes Against Women.

Quantifying crimes against women reveal heartbreaking results, thus emphasizing the fact that there is an imminent need for sensitization of men and women alike, the former to understand and introspect the patriarchal societal ways they live by and the latter not to take the onus of the crime. Despite measures taken by lawmakers in reducing crimes against women, it is evident that women are yet to establish a position of status in society; strategies to minimize the occurrence of crime against women should be complemented by interventions to build personal capacity and resources because these offer the potential to improve the living circumstances of women. Women suffer isolation, inability to work, loss of wages, lack of participation in regular activities, and limited ability to care for themselves and their children and are inflicted with significant health consequences. (Violence against Women, 2021) Furthermore, educating women about their fundamental rights and focusing on their empowerment should be a priority for the nation's welfare. Policies and programs need to address the enormous social and economic costs of crime, which have long-lasting ripple effects throughout society. Gender mainstreaming should be an essential part of government policymaking, taking into account the interests and concerns of all genders. It is important to remember that while reducing crime against women is an important step, it is just one step of the long road of equity and empowerment.

## A Appendix

### A.1 IPC Crimes against Women (Crime Head-wise & States /UT-wise) - 2018:

Murder with Rape/Gang Rape Dowry Deaths (Sec. 304B IPC); Abetment to Suicide of Women (Sec. 305/306 IPC); Miscarriage (Sec. 313 & 314 IPC); State/UT Acid Attack (Sec. 326A IPC); Attempt to Acid Attack (Sec. 326B IPC); Cruelty by Husband or his relatives (Sec. 498 A IPC); Kidnapping & Abduction of Women (Total) [Kidnapping & Abduction (Sec. 336 IPC), Kidnapping & Abduction in order to Murder (Sec. 364 IPC), Kidnapping for Ransom (Sec. 364A IPC), Kidnapping & Abduction of Women to compel her for marriage (Sec. 366 IPC)]; K&A of Women to compel her for marriage (Total) [Women (Above 18 yrs), Kidnapping & Abduction of Women to compel her for marriage (Sec. 366 IPC) Procurement of Minor Girls (Sec. 366A IPC) Importation of Girls from Foreign Countries (Sec. 366B IPC), Kidnapping and Abduction of Women – Others (Secs.363A, 365, 367, 368, 369 IPC) Human Trafficking (Sec. 370 & 370A IPC) Selling of Minor Girls (Sec. 372 IPC)]; Rape (Sec. 376 IPC) State/UT Buying of Minor Girls (Sec. 373 IPC), Rape (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs); Attempt to Commit Rape (Sec. 376/511 IPC) [Attempt to Commit Rape (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs)]; Assault on Women with Intent to Outrage her Modesty (Sec. 354 IPC); Assault on Women with Intent to Outrage her Modesty (Total), A) Women (18 Yrs. And above), B) Girls (Below 18 yrs); Insult to the Modesty of Women (Sec. 509 IPC); Insult to the Modesty of Women (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs)

### A.2 SLL Crimes against Women (Crime Head-wise & States /UT-wise) - 2018:

Dowry Prohibition Act, 1961; Immoral Traffic (Prevention) Act 1956 (Women Victims cases only) [Immoral Traffic (Prevention) Act, 1956 (Total) A) Procuring, inducing Children for the sake of prostitution (Section 5) B) Detaining a person in premises where prostitution is carried on (Section 6)]; Immoral Traffic (Prevention) Act 1956 (Women Victims cases only) [C) Prostitution in or in the vicinity of public places (Section 7) D) Seducing or soliciting for prostitution (Section 8) E) Other Sections under ITP Act]; Protection of Women from Domestic Violence Act; Cyber Crimes/Information Technology Act (Women Centric Crimes only) [Cyber Crimes/Information Technology Act (Women Centric Crimes only) (Total) A) Publishing or Transmitting of Sexually Explicit Material (Sec. 67A/67B (Girls) IT Act) B) Other Women Centric Cyber Crimes (Ex. Blackmailing/ Defamation/Morphing/ Fake Profile)]; Protection of Children from Sexual Violence Act (Girl Child Victims only)[Protection of Children from Sexual Violence Act (Girl Child Victims only) (Total) A) Child Rape (Sec. 4 & 6 of POCSO Act) / Sec. 376 IPC) B) Sexual Assault of Children (Sec. 8 & 10 of POCSO Act) / Sec. 354 IPC) C) Sexual Harassment (Sec. 12 of POCSO Act) / Sec. 509 IPC)]; Protection of Children from Sexual Violence Act (Girl Child Victims only) D) Use of Child for Pornography/Storing Child Pornography Material (Sec. 14 & 15 of POCSO Act) E) POCSO Act (Sections 17 to 22) / Other offences of POCSO Act F) POCSO Act

r/w Section 377 IPC / Unnatural Offences, Indecent Representation of Women (Prohibition) Act, 1986.]

### A.3 Multicollinearity

Variable	Variance Inflation Factor
GER	2.673701
UNEM	1.074347
PCI	2.740375

*Source:* Authors' calculations.

### A.4 Breusch-Pagan Test for Heteroscedasticity

Test	Test-statistic	p-value	Result
Breusch-Pagan Test	8.0734	0.04452	Evidence of Heteroscedasticity

*Source:* Authors' calculations.

### A.5 Correction for Heteroscedasticity

Independent Variable	Coefficient	Robust Standard Error	T-statistic
Intercept	4.2217***	0.22146	19.0626
GER	-0.032950**	0.0097061	-3.3948
UNEM	0.0068983**	0.0018608	3.7071
PCI	0.0000038096**	0.0000011352	3.3560

*Source:* Authors' calculations.

### A.6 Breusch-Godfrey Test for Serial Correlation

Model	Chi-square statistic	p-value	Alternative Hypothesis	Null Hypothesis
Random Effects	0.10588	0.7449	Serial correlation in idiosyncratic errors	Accepted

*Source:* Author's calculations.

### A.7 Hausman Test

To decide between Fixed Effects Random Effects Estimation, we conducted the Breusch-Pagan Lagrange Multiplier Test, wherein:

$H_0$ : Random Effects Model would give consistent Results

$H_A$ : Fixed Effects Model would give consistent Results

## A.8 Breusch-Pagan Lagrange Multiplier Test

To decide between Pooled OLS & Random Effects Estimation, we conducted the Breusch-Pagan Lagrange Multiplier Test, wherein:

$H_0$ : Random Effects Model would give consistent Results

$H_A$ : Pooled OLS Model would give consistent Results

The results of both tests are given as follows:

Test	P-value		Estimation Method Preferred
Hausman Test	0.8909	Null Accepted	Random Effects
Breusch-Pagan Lagrange Multiplier Test	0.2889	Null Accepted	Random Effects

*Source:* Authors' calculations.

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