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THE NEXUS BETWEEN FEMALE UNEMPLOYMENT AND CHILD ABUSE: THE MODERATING ROLE OF INFLATION

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ABSTRACT. Child abuse has been a significant issue in Malaysia, with an escalating number of documented cases over the years. More than 2,000 children are reportedly abused each year in the region. Child abuse negatively impacts the community, as children who have been abused may struggle in school, have difficulty forming healthy relationships, and may be more likely to engage in criminal behaviour. This study investigates the nexus between child maltreatment and female unemployment in Malaysia, with the Consumer Price Index (CPI) acting as a moderating variable. The employment of the Autoregressive Distributed Lag (ARDL) approach enables the analysis to encompass the data on GDP per capita, CPI, child abuse cases, and female unemployment rates from 1989 to 2021. The findings reveal a strong correlation between inflation and child abuse cases, suggesting that rising living costs increase parental stress as families struggle to afford basic necessities. Additionally, higher female unemployment rates are associated with increased child abuse incidents, as financial instability and job insecurity create additional pressures on mothers. When women are unemployed and face economic hardship, they may experience emotional distress, heightening the risk of child maltreatment. Furthermore, divorce is also found to be a contributing factor to child abuse. These findings can be useful for policymakers. In particular, the government should implement policies that promote flexible work arrangements, such as telecommuting or part-time employment, to help women better balance work and family responsibilities.

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1. Introduction

While child maltreatment has been the subject of numerous previous studies, it remains a critical topic that requires continued and urgent focus due to its widespread occurrence worldwide. According to the NSPCC (2020), child abuse happens when a child experiences harm inflicted by an adult or another child. It encompasses various forms, including sexual, physical, and emotional abuse, as well as neglect. Beyond causing immediate physical harm, child abuse leads to severe psychological and long-term health consequences for victims. Additionally, its impact extends beyond individuals, contributing to societal issues such as an increased likelihood of victims engaging in future violent crime, anti-social behavior, and the perpetuation of abuse across generations. Given these serious consequences, continuous research is essential to informing policymakers developing effective interventions.

Several factors contribute to the rising child abuse rates, including increasing parental divorce, unemployment, and poverty (Yob et al., 2022; Shaari et al., 2022; Brown & DeCao, 2018; Raissian, 2015). Among these, unemployment is a significant driver of stress, which has been associated with children being abused. Prior studies have revealed a correlation between child abuse and unemployed parents, as job loss increases the likelihood of physical and psychological abuse within households (Lawson et al., 2022; WHO Global, 2020). The COVID-19 pandemic further intensified these risks, creating widespread economic instability and family stress. As a result, households that experienced sudden job losses were more likely to struggle with financial insecurity, increasing the risk of child abuse (Substance Abuse & Mental Health Services Administration, 2020; The Alliance for Child Protection in Humanitarian Action, 2020).

Moreover, Bywaters et al. (2016) and Shaari et al. (2019) highlighted that poverty significantly raises the risk of child maltreatment. Interestingly, economic expansion may also initially contribute to higher child abuse rates. Shaari et al. (2021) and Zainal et al. (2023) disclosed that as a country's economy begins to expand, child abuse may rise before eventually declining. Shaari et al. (2021) further explain that as economic conditions improve and household incomes increase, child abuse rates may gradually decrease over time. These findings show that economic factors and child abuse are closely connected, highlighting the need for specific social policies to reduce risks and keep children safe.

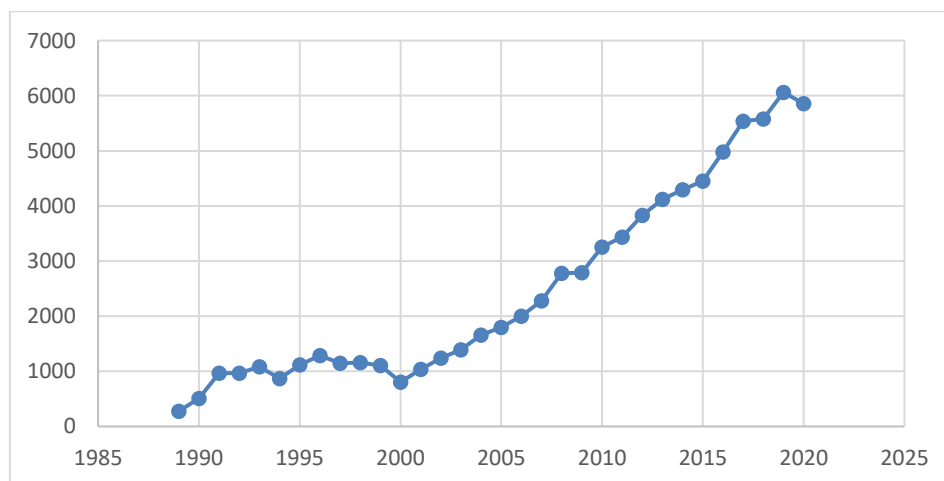
Previous research, including studies by Raissian (2015), Shaari et al. (2015), and Brown and DeCao (2018), has largely overlooked how women job loss affects child abuse. While Kim (2022) explored how parents losing their jobs can lead to child abuse. in South Korea during the COVID-19 outbreak, attention was primarily paid to male unemployment. Kim's findings showed a significant correlation between a 1% rise in men losing their jobs and more calls to child abuse hotlines. However, the specific link between female unemployment and child maltreatment remains underexplored.

This research fills up two key gaps in the previous studies. First, it examines the nexus between female unemployment and child abuse, recognizing that economic hardship can increase parental stress and the risk of maltreatment. Second, it investigates how inflation moderates this nexus, as a high cost of living may intensify financial strain and further heighten stress levels among unemployed mothers. We argue that job loss, especially in times of rising living costs, creates economic and emotional pressures that may increase the likelihood of child

abuse. By exploring these dynamics, this study provides a clearer understanding of how macroeconomic conditions intersect with female unemployment and child maltreatment.

Statistics indicate that the majority of child abuse offenders are biological mothers, highlighting the need for this investigation. Unemployment can lead to financial stress, straining family nexuses and increasing parental stress. The added pressure can lead parents to neglect their caregiving, potentially result in child abuse and neglect. Mothers struggling to afford childcare while unemployed may leave children unsupervised for extended periods, increasing their vulnerability to neglect and abuse. Additionally, unemployed mothers may face challenges in accessing affordable, high-quality childcare, placing children in unsafe or inadequate environments. Research suggests that women often experience higher stress levels than men due to societal expectations, discrimination, bias, and limited support networks. As a result, rising female unemployment is likely to contribute to a higher number of children being abused.

Graph 1 illustrates a concerning upward trend in child abuse cases in Malaysia, rising sharply from 276 cases in 1989 to 5,858 cases in 2020. This alarming increase demands urgent attention, as child abuse negatively impacts not only the victims but also the economy and society as a whole (Celik & Odaci, 2020). Studies have shown that child abuse can lead to externalized problems such as increased violence, engagement in risky behaviors, and self-harm (Bruffaerts et al., 2010; Odaci & Celik, 2017). In extreme cases, abuse may even drive children to suicide. This study focuses on Malaysia, where reported child abuse cases have consistently risen, with projections indicating a continued upward trend. Table 1 categorizes various forms of child abuse reported in Malaysia, including physical, sexual, and emotional abuse, as well as neglect. In 2020, cases of sexual and emotional abuse reached record highs, while reports of physical abuse, negligence, and abandonment declined. Sexual abuse was the most prevalent, accounting for 33% of all cases. Reported incidents of sexual abuse increased from 1,856 in 2019 to 1,915 in 2020. Conversely, parental negligence cases dropped from 2,153 in 2019 to 1,618 in 2020. Similarly, reports of physical abuse decreased from 1,571 in 2019 to 1,464 in 2020, a decline of 107 cases. These patterns highlight the importance of specific plans and actions to prevent child abuse and tackle its root causes.



Graph 1: Malaysia's child abuse case from 1989 to 2020

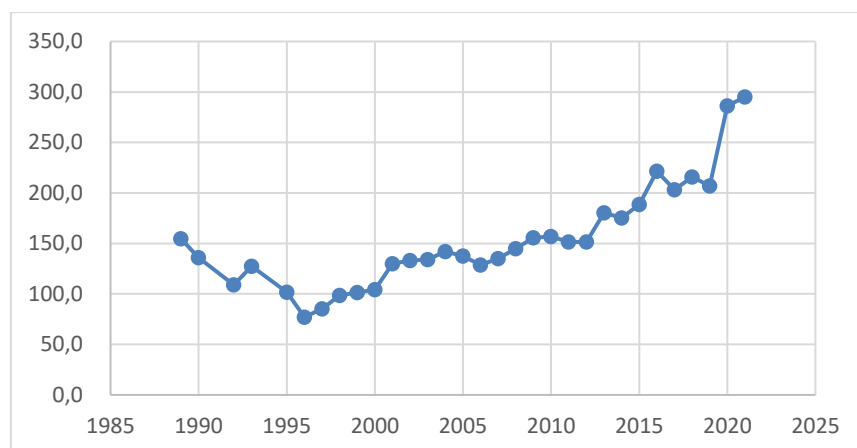
Source: Department of Social Welfare Statistics Report (2020)

Table 1. Child abuse cases by types in Malaysia

Types of Abuse	2019	2020
Physical	1,571	1,464
Sexual	1,856	1,915
Emotional	120	185
Negligence	2,153	1,618
Unfit parenting	368	449
Abandonment/the absence of parents	168	162
Others	146	65
Total	6,382	5,858

Source: Department of Social Welfare (2020)

Graph 2 shows a steady annual increase in the number of unemployed women in Malaysia, rising from 154,800 in 1989 to 295,000 in 2021. The influence of COVID-19 in early March 2020 further exacerbated this trend, with female unemployment surging from 207,100 in 2019 to 286,300 in 2020—a 38% increase. This sharp rise in unemployment likely contributed to increased financial strain and stress, which would have contributed to the increase in child abuse cases.



Graph 2. Unemployed Women (000) in Malaysia from 1989 to 2021

Source: Department of Statistics Malaysia (2021)

2. Literature review

The family stress theory was introduced by Doherty (1974), a researcher in the discipline of family research and child growth. Changes in the environment, such as a rise in the cost of living, can cause stress from financial issues, leading to strained family nexuses and marital conflict, which may harm children's well-being. Similarly, unemployment can lead to financial stress, as well as emotional stress on the individual, and this can lead to strain on family linkages and negatively affect the well-being of children. The theory also suggests that families with more resources, such as social support and more adaptive coping mechanisms, are better able to deal with environmental stressors and are less likely to resort to child abuse and neglect.

It also explains how changes in family life and the environment, such as a rise in the cost of living and unemployment, can lead to stress and strain on the family system, which in turn can lead to negative outcomes such as child abuse and neglect. Kelleher and Kelleher

(1998) found that unemployment is significant in affecting child abuse. Skinner et al. (2023) and Zhang et al. (2022) found that when the cost of living goes up, it can lead to more child abuse and neglect. They said that money problems and stress make this link stronger.

From a national, state, or neighbourhood perspective, prior research has shown that several factors might lead to child abuse. Families' financial status and economic instability are the two main causes of child abuse. In comparison to children with parents' higher income levels, Sedlak and others (2010) obtained those children from low-income families have a greater likelihood of facing harm. They face a higher risk of harm, greater chances of mistreatment, and are more prone to neglect. Aspects like families with single parents and not highly educated parents, both of which are linked to low socioeconomic status among households, are critical in higher child abuse cases (Sedlak et al., 2010). Different studies broadly confirmed these findings, including Raissian and Bullinger (2017), Ma et al. (2022), and Bywaters and Skinner. Children in families caught in poverty for extended periods have a higher chance of facing the impacts of child abuse (2022).

Access restrictions to social benefits have the potential to cause negative financial shocks and raise the risk of child abuse. A study was done by Cai (2022) focusing on Wisconsin families who would need to get in touch with Child Protective Services (CPS). The study found a linkage between income and ensuing child abuse. A 30% or greater negative income shock in a household was associated with an 18% greater risk of CPS involvement. However, the impact diminished and eventually vanished when benefit programs countered a salary reduction.

According to Raissian and Bullinger (2017), a rise in income per hour indicates a drop in reported child neglect, specifically for small and school-age children up to 12. When families have more money to spend, they can take much better care of their children. They can buy proper clothes to keep their children warm and comfortable. They can also provide healthier food, which helps children grow strong and stay healthy. Having more money means parents can take their children to the doctor when they are sick or need a check-up. It also allows them to improve their homes, making them safer and more comfortable for children to live in. Overall, having more money helps parents meet all the important needs of their children. Zhang et al. (2022) found that, after considering county-level factors, higher country-level Gini index (income inequality) scores were highly associated with the number of child maltreatment. Studies found that child maltreatment and neglect occur more frequently in areas with significant income disparities. Poorer areas make this problem worse, as poverty increases the effects of these gaps.

Schneider et al. (2017) discovered a correlation between a rise in the number of local people losing their jobs, a rise in physical aggressiveness, and a rise in the likelihood of emotional intimidation. However, a rise in the rate of local people losing jobs relates to a drop in the chance that mothers will hurt their children physically and a decline in the likelihood of mothers losing their supervisory skills. This discovery might be connected to strict parenting brought on by parental stress. Using data from 48 US states, this analysis validated the findings put forth by Schenck-Fontaine and Gassman-Pines (2020). They found that only over six months, state-level income disparity mediated the link between job losses and a lagged rise in physical abuse. Physical abuse and neglect were expected to happen more frequently in areas of low-income gap. This interesting result may be attributed to the reduced likelihood of reemployment in states with a low-income gap, where families might face increased stress and unpredictability, as a result of job losses.

Meanwhile, a study by Brown and De Cao (2017) discovered that for every one per cent rise in the rate of people losing jobs, the overall rate of abuse and neglect rose by 10%. Black children have a greater likelihood of experiencing maltreatment, especially if they were raised

in single-parent households where one parent's income was insufficient to make up for the other's loss of employment.

The repercussions of unemployment for children amid the COVID-19 outbreak have been the subject of numerous studies. The COVID-19 outbreak exacerbated the risk of parental burnout due to financial loss following unemployment and concern about future employment stability. Due to these consequences, parents who are burnt out have a greater likelihood of abusing and neglecting their children (Griffith, 2020). This conclusion is corroborated by Connell and Strambler (2021), who found a link between parental involvement in abuse and parental stress from being confined at home during lockdowns. These conclusions correspond to those of Massiot et al. (2022), whose research revealed a sharp rise in abuse cases during the French lockdown, followed by a rise in hospital admissions and judicial referrals to the prosecutor for the next three months.

During the early days of COVID-19, Ma et al. (2022) pinpointed that older children with A parent or adult at home who became unemployed had a higher chance of facing emotional or physical abuse. Losing a job can make parents feel very sad, and stressed, or use harmful substances, which can affect how they treat their children. Kim (2022) studied this in South Korea and found that when more men lost their jobs, there were more calls to child abuse hotlines. These studies show that unemployment can make people feel emotionally unstable, which can lead to more child abuse.

3. Research methodology

This study looks at how child abuse in Malaysia is affected by female unemployment. Since child abuse is a serious social issue in Malaysia, it needs to be addressed immediately. To fulfill the aims of this study, data spanning 32 years, from 1989 to 2021, were gathered in Malaysia on child maltreatment and female unemployment. In this study, the repercussions of female unemployment for children are estimated using the autoregressive distributed lag (ARDL) method. This research uses several indicators to explore the impacts of female unemployment on child abuse. Female unemployment, consumer price index, and GDP at constant prices are treated as independent variables, while child abuse is considered a dependent variable in this study.

This study's model is as follows since this study analyses how female unemployment, economic expansion, and inflation affect child abuse directly:

$$CA = \alpha + \beta_1 CPI + \beta_2 D + \beta_3 FUR + \beta_4 GDP + \mu_t \quad (1)$$

Equation 1 examines the direct effects of several key economic and social factors—CPI, economic expansion, divorce rates, and female unemployment—on child abuse. However, this initial model does not account for potential interaction effects between these variables. To gain deeper insights, we introduce CPI as a moderating variable in the nexus between female unemployment and child abuse. Economic theory suggests that inflation can intensify financial distress, particularly for unemployed individuals, by reducing purchasing power and increasing household expenses. When combined with job loss, rising living costs may heighten parental stress, potentially exacerbating the risk of child abuse. By incorporating this interaction term, our revised equation captures how inflation influences the strength and direction of the nexus between female unemployment and child abuse. This approach allows us to assess whether higher inflation amplifies the negative effects of job loss on family well-being or, conversely, whether the impact diminishes in certain economic conditions. The new equation is formulated as follows:

$$CA = \alpha + \beta_1 FUR + \beta_2 D + \beta_3 FUR * CPI + \beta_4 GDP + \mu_t \quad (2)$$

Equations 1 and 2 should be transformed into logarithms for time-series data analysis to investigate the percentage change in child abuse as a function of inflation, economic expansion, and female unemployment. The natural logarithmic transformation is also used to address autocorrelation issues. Thus, new equations are so as follows:

$$LNCA = \alpha + \beta_1 LNCPI + \beta_2 LND + \beta_3 LNFUR + \beta_4 LNGDP + \mu_t \quad (3)$$

$$LNCA = \alpha + \beta_1 FUR + \beta_2 LND + \beta_3 LNFUR * CPI + \beta_4 LNGDP + \mu_t \quad (4)$$

whereby,

LNCA represents the natural logarithm of the number of child abuse cases.

LNFUR represents the natural logarithm of female unemployment.

LNCPI represents the natural logarithm of the Consumer Price Index (CPI).

LNGDP represents the natural logarithm of GDP at constant prices.

LNFUR*CPI represents the interaction term between female unemployment and inflation, capturing the moderating influence of inflation on the nexus between female unemployment and child abuse.

LND represents the natural logarithm of the divorce rate.

α is the intercept.

$\beta_1 \beta_2 \beta_3 \beta_4$ - are the regression coefficients.

μ_t - is the error term.

Unit root test

For the analysis, this investigation employs annual data on macroeconomic variables. Therefore, carrying out a unit root test is essential to check the stationarity of the data. The analysis is conducted using the augmented Dickey-Fuller method, as it has been widely employed in previous studies. The null hypothesis of the unit root test shows that the data is not stationary. This study uses integrated variables of order I(0) and I(1). In this study, it implies that the ARDL approach may be applied. The unit root test equation is as present in equation 3:

$$\Delta X_t = \alpha_1 + \beta_1 \Gamma + \beta_2 X_{t-1} + \sum_{i=1}^m \alpha_i \Delta X_{t-i} + \mu_t \quad (5)$$

X represents the variable used in this study to test for stationarity

Γ represents the linear trend

ΔX_{t-1} represents the lag difference

α_1 represents the intercept

t represents the time trend.

The null and alternative hypotheses for the stationarity are as follows:

$H_0: \alpha = 0$ (there is unit root or no stationarity)

$H_1: \alpha \neq 0$ (there is no unit root or stationarity)

Autoregressive Distributed Lag (ARDL) technique

To determine if there is a long-term nexus between female unemployment, inflation (CPI), economic expansion (GDP), and child maltreatment, a co-integration test is necessary. This test helps identify whether these variables move together over time, even if they may seem unrelated in the short term. The ARDL (Autoregressive Distributed Lag) bounds testing method is commonly used for this purpose due to its flexibility. It can handle variables that are either stationary at their original levels (I(0)) or become stationary after being differenced once (I(1)), but not those that require differencing twice (I(2)). Before using the ARDL method, a unit root test is conducted to confirm the nature of the variables.

The co-integration test relies on comparing the F-statistic to critical values, as outlined by Pesaran et al. (2001), if the computed F-statistic surpasses the upper critical bound, it indicates co-integration, meaning the variables have a long-term linkage. If the F-statistic is below the lower bound, there is no co-integration, and the variables do not share a long-term connection. If the F-statistic falls between the bounds, the results are inconclusive. When co-integration is established, it allows researchers to delve into both long-term and short-term nexuses between the variables.

This analysis is significant because it helps uncover how factors like female unemployment, inflation, or economic expansion influence child maltreatment rates. For example, it can show whether higher unemployment consistently leads to more child maltreatment over time or if inflation has short-term effects on families. By modelling these nexuses, researchers can identify both long-term trends and immediate impacts. The findings can guide policymakers in creating effective interventions, such as support for unemployed parents or measures to reduce the impact of economic pressures on child welfare. The following equation 4 can be used to express the long-run and short-run models:

$$\begin{aligned} \Delta \text{LNCA}_t = & \beta_1 + \theta_0 \text{LNCA}_{t-1} + \theta_1 \text{LNCPI}_{t-1} + \theta_2 \text{LND}_{t-1} + \theta_3 \text{LNFUR}_{t-1} \\ & + \theta_4 \text{LNGDP}_{t-1} + \sum_i^p \pi_1 \text{LNCA}_{t-1} \\ & + \sum_{j_t}^q \pi_1 \text{LNCPI}_{t-1} + \sum_k^r \pi_1 \text{LND}_{t-1} + \sum_l^s \pi_1 \text{LNFUR}_{t-1} \\ & + \sum_m \pi_1 \text{LNGDP}_{t-1} + u_1 \quad (6) \end{aligned}$$

Where u_t represents the white noise disturbance, and Δ is the first difference operator. The model should be stable, and the UECM residuals ought to be serially uncorrelated. Diagnostic tests can be used to address this validation. Another way to think of the ARDL model is as Equation 4's last representation of the model. The coefficients of the first differenced variables capture the short-term effects. Then, to increase the impact of this study and novelty, the intercept of female unemployment and the inflation as shown in equation 5:

$$\begin{aligned}
\Delta \text{LNCA}_t = & \beta_1 + \theta_0 \text{LNCA}_{t-1} + \theta_1 \text{LNCPI}_{t-1} + \theta_2 \text{LND}_{t-1} + \theta_3 \text{LNFUR}_{t-1} \\
& + \theta_4 \text{LNGDP}_{t-1} + \theta_5 \text{LNFURCPI}_{t-1} + \sum_{i=1}^p \pi_i \text{LNCA}_{t-i} \\
& + \sum_{j=1}^q \pi_j \text{LNCPI}_{t-j} + \sum_{k=1}^r \pi_k \text{LND}_{t-k} + \sum_{l=1}^s \pi_l \text{LNFUR}_{t-l} \\
& + \sum_{m=1}^t \pi_m \text{LNGDP}_{t-m} + \sum_{n=1}^u \pi_n \text{LNFURCPI}_{t-n} + u_1 \quad (7)
\end{aligned}$$

The null of no co-integration in the long-run linkage is defined as follows:

$H_0: \theta_0 = \theta_1$ (there is no long-run linkage),

$H_1: \theta_0 \neq \theta_1$ (there is a long-run linkage),

Taking into account the condition in which the estimated F-statistic is less than the lower bound critical value, the possibility of the existence of co-integration is not ruled out. But let's say the estimated the F-statistic exceeds the upper critical limit., at least at the 10% significance level. In light of this, we reject the null hypothesis that the variables are not cointegrated.

4. Findings from Analysis

The descriptive statistics show that child abuse, inflation, divorce, female unemployment, and GDP exhibit moderate variability. Inflation appears to be the most normally distributed variable, while female unemployment is slightly skewed with a more peaked distribution. Divorce rates are fairly symmetric, indicating balanced variation. GDP remains relatively stable compared to the other variables. The normality test suggests that all variables follow an approximately normal distribution, ensuring reliable statistical analysis. With 33 observations, the dataset provides sufficient information for reliable analysis.

Table 1. Descriptive statistic results

	LNCA	LNCPI	LND	LNFUR	LNGDP
Mean	7.5817	4.4741	4.9758	1.3205	10.2428
Median	7.4955	4.4747	4.9060	1.2809	10.2456
Maximum	8.7232	4.8126	5.6924	1.8718	10.6784
Minimum	5.6204	4.0139	4.2399	0.9555	9.6620
Std. Dev.	0.8013	0.2419	0.4850	0.1860	0.2823
Skewness	-0.2371	-0.2809	0.0730	0.8681	-0.2505
Kurtosis	2.3268	1.9709	1.6438	4.1077	2.2138
Jarque-Bera	0.9323	1.8902	2.5582	5.8321	1.1951
Observations	33	33	33	33	33

The unit root test results reveal that most variables are non-stationary at level but become stationary after first differencing, except for inflation and female unemployment, which are already stationary at level. Child abuse, divorce rate, and GDP exhibit unit roots at level, indicating that they are not stationary, but they become stationary after first differencing, confirming their integration at I(1). Since the dataset contains a mix of I(0) and I(1) variables, we can proceed with the ARDL model, which is suitable for analysing long-run and short-run nexuses in such cases.

Table 2. Unit root results

Variable	Level		First Difference	
	t-Statistic	Prob.	t-Statistic	Prob.
LNCA	-2.4584	0.1348	-5.1461	0.0002
LNCPI	-3.2650	0.0252	-4.2089	0.0025
LND	-0.5488	0.8683	-5.1547	0.0002
LNFOR	-3.3878	0.0190	-5.5310	0.0001
LNGDP	-2.1380	0.2319	-5.0693	0.0003

The Bounds Test evaluates the presence of a long-term cointegration relationship among variables within an ARDL model. The F-statistic for Model 1 is 9.6789, and the F-statistic for Model 2 is 6.5601. These values are compared against the critical values at different significance levels for the lower bound $I(0)$ and the upper bound $I(1)$. Since both F-statistics exceed the upper bound critical value ($I(1)$) at all significance levels, we reject the null hypothesis of no cointegration. This confirms that there is a long-run nexus among the variables in both models.

Table 3. Bound test results

Significance Level	F-Statistic (Model 1)	F-Statistic (Model 2)	$I(0)$ (Lower Bound)	$I(1)$ (Upper Bound)
10%	9.6789	6.5601	2.45	3.52
5%			2.86	4.01
2.50%			3.25	4.49
1%			3.74	5.06

The long-run estimation results from Model 1 and Model 2, presented in Table 2, provide valuable insights into the long-term nexus between child abuse, divorce rates, female unemployment, GDP, and inflation. In Model 1, the findings indicate that female unemployment and inflation significantly influence child abuse, whereas divorce rates and GDP do not exhibit a strong effect. Female unemployment has a positive and statistically significant impact, meaning that as female unemployment rises, child abuse cases increase. This suggests that job loss among women may lead to financial instability, heightened stress, and a lack of social support, all of which contribute to a greater likelihood of child abuse. Similar patterns have been observed during economic recessions, where families facing financial crises experience higher rates of child maltreatment (Conrad-Hiebner & Byram, 2020; Schenck-Fontaine & Gassman-Pines, 2020). Model 1 suggests that economic hardship from job loss leads to higher stress in households, which in turn affects children negatively. Inflation also shows a strong positive nexus with child abuse, meaning that as inflation rises, child abuse cases increase significantly. According to Latimaha et al. (2020), higher inflation increases the cost of living, making it harder for families to afford basic necessities. The additional financial burden may lead to higher parental stress and frustration (Mistry and Elenbaas, 2021), and increasing the risk of child abuse (Johnson et al., 2022). Divorce has a negative but statistically insignificant effect, suggesting that divorce rates do not play a major role in influencing child abuse cases in this model. GDP has a negative nexus with child abuse, meaning that as the economy grows, child abuse cases tend to decline. However, this influence is not statistically significant, indicating that economic expansion alone does not have a direct impact on reducing child abuse in the long run.

The results for Model 2 indicate a strong positive nexus between divorce rates and child abuse. A 1% increase in divorce corresponds to a 1% rise in child abuse, and this influence is statistically significant at the 5% level. This suggests that as more marriages dissolve, children

may experience increased instability, emotional distress, and weakened parental support, making them more vulnerable to abuse. This finding aligns with several studies that have also observed higher rates of child abuse following parental divorce (Cederbaum et al., 2020; Yob et al., 2022; Miralles et al., 2023). On the other hand, the female unemployment rate has a surprising negative influence on child abuse, with a 1% increase in female unemployment leading to an 18% decrease in child abuse cases. This could suggest that unemployed mothers spend more time at home, potentially reducing cases of neglect and abuse. A study by Sato (2021) supports this finding, as his research indicates that housewives tend to be happier compared to working wives.

Economic expansion, represented by GDP, shows a negative nexus with child abuse, suggesting that as the economy improves, child abuse cases tend to decrease. However, this influence lacks statistical significance, implying that GDP alone does not have a strong direct impact on child abuse in the long run. The interaction between female unemployment and inflation has a significant impact on child abuse. The results indicate that when inflation is high, the negative effects of female unemployment on child abuse become more pronounced. Rising living costs place additional financial strain on families, making it more difficult for parents to provide for their children. A study by Oikawa et al. (2022) found that economic shocks in Japan's local labor market led to increased child maltreatment and, in some cases, even child fatalities. Fitzpatrick et al. (2024) highlighted that in the modern world, many women are compelled to work to cope with the rising cost of living. However, if they become unemployed during periods of high inflation, financial hardship intensifies, increasing the risk of frustration, neglect, or harsher discipline toward children (Yob et al., 2022). This financial pressure heightens the likelihood of child abuse as parents struggle with stress and uncertainty about meeting basic needs. Several studies further support this link, particularly during the COVID-19 pandemic, when many parents experienced extreme financial stress due to economic uncertainty. Research has documented cases of increased child maltreatment and abuse during this period (Şenol & Üstündağ, 2021; Rodriguez et al., 2021; Wong et al., 2021; Griffith, 2022).

Table 4: Long-run estimation results

Variable	Coefficient	Model 1		Coefficient	Model 2	
		t-Statistic	Prob.		t-Statistic	Prob.
LND	-0.2146	-0.4739	0.6416	0.9700	2.4227	0.0276
LNFUR	1.1982	3.7713	0.0015	-17.9959	-1.9531	0.0685
LNCPI	7.4744	2.4731	0.0242	-	-	-
LNGDP	-2.6970	-1.4066	0.1776	-3.4129	-1.3459	0.1971
LNFURCPI	-	-	-	4.3435	2.0964	0.0523

Source: *own data*

The short-run estimation results presented in Table 3 provide insights into the immediate effects of divorce, female unemployment, GDP, and inflation on child abuse in Models 1 and 2. In Model 1, the findings indicate that only inflation has a significant short-run impact on child abuse, with a coefficient of 2.2025, significant at the 1% level. This suggests that rising inflation directly contributes to an increase in child abuse cases, likely due to higher living costs, financial instability, and increased household stress.

Table 5. Short-run estimation results

	Model 1			Model 2		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
LND	-0.0975	-0.5064	0.6191	0.3321	1.0920	0.2910
LNFDUR	-0.0877	-0.5584	0.5838	-8.6861	-2.4224	0.0277
LNCPI	5.2025	3.6095	0.0022	-	-	-
LNGDP	-0.8222	-1.3411	0.1975	-0.3320	-0.4357	0.6689
LNFDURCPI	-	-	-	1.8775	2.3585	0.0314
C	0.5082	0.1376	0.8922	17.1854	1.7046	0.1076

Source: *own data*

This finding aligns with Shaari et al. (2022), who found a strong correlation between child abuse and inflation in Malaysia. Similarly, Woldemichael et al. (2022) reported that food inflation has a significant impact on child health, reinforcing the notion that economic instability can negatively affect children's well-being. In contrast, divorce, female unemployment, and GDP do not show statistically significant short-run effects, implying that changes in these factors do not immediately influence child abuse levels. For Model 2, the results reveal that the interaction between female unemployment and inflation is statistically significant at the 5% level, indicating that inflation amplifies the negative effects of female unemployment on child abuse.

Table 6. Diagnostic results

Diagnostic Test	Model 1		Model 2	
	F-Statistic	p-Value	F-Statistic	p-Value
Jarque-Bera Test	0.2636	0.8765	1.7891	0.4088
Serial Correlation LM Test	2.2225	0.1000	0.6649	0.5298
Breusch-Pagan-Godfrey Test	1.2035	0.3542	0.8199	0.6367
Ramsey RESET Test	0.3688	0.7171	1.5704	0.2294

Source: *own data*

The positive coefficient (1.8775) suggests that as inflation rises, financial stress within households worsens, intensifying the adverse impact of female unemployment on child abuse. This result is supported by Mansor et al. (2022), who found that inflation significantly affects low-income Malaysian citizens, leading to financial stress. These findings suggest that while unemployment alone may not have an immediate influence on child abuse, its combination with rising inflation increases the risk in the short run. On the other hand, divorce and GDP remain statistically insignificant in Model 2, consistent with Model 1. This reinforces the idea that short-term changes in divorce rates and economic expansion do not have an immediate impact on child abuse cases.

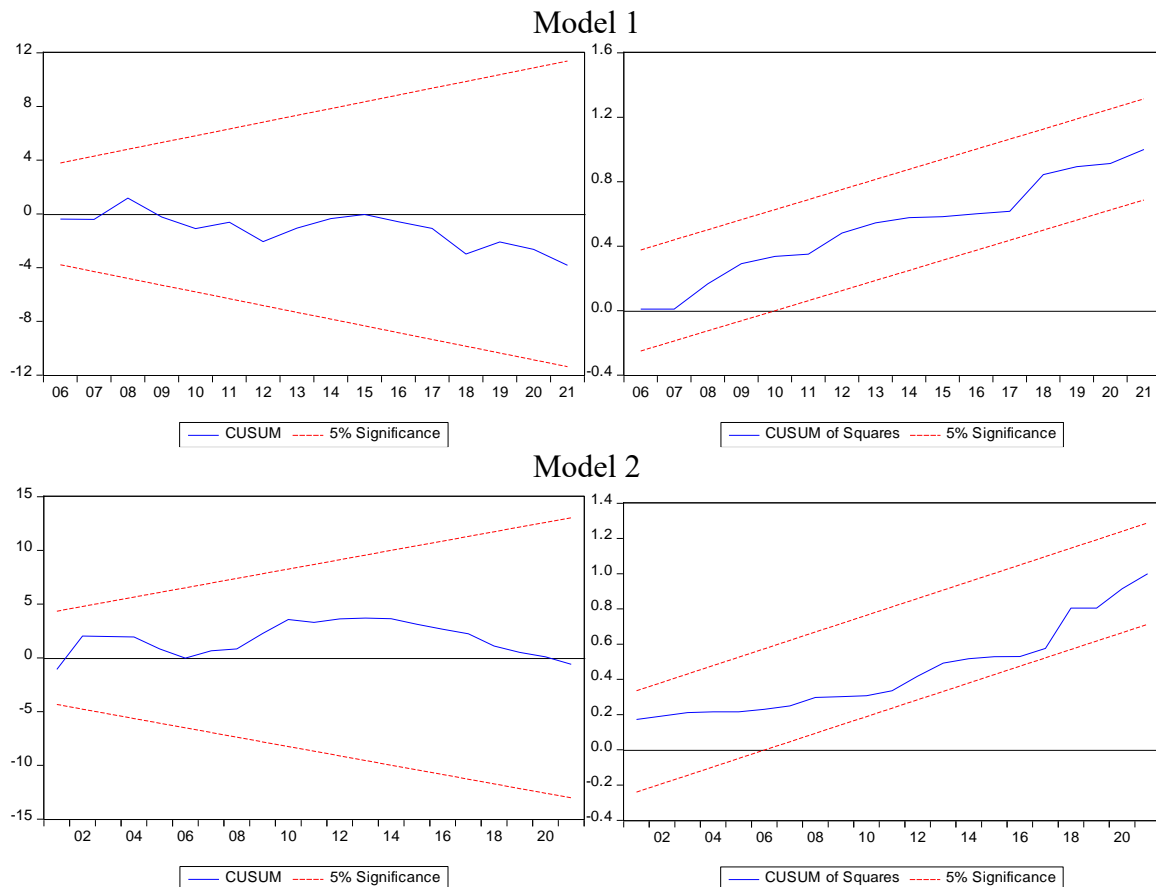


Figure 1. CUSUM and CUSUMQ Stability Results

Source: *own data*

The diagnostic test results indicate that the ARDL model does not suffer from major econometric issues. The Jarque-Bera test confirms that the residuals are normally distributed, as the p-value is greater than 0.05, meaning we fail to reject the null hypothesis of normality. The Breusch-Godfrey Serial Correlation LM Test suggests that there is no serial correlation in the residuals, ensuring the validity of the model's estimations. The Breusch-Pagan-Godfrey test for heteroskedasticity indicates that the model does not suffer from heteroskedasticity, meaning the variance of residuals is constant. Lastly, the Ramsey RESET test shows that the model is correctly specified with no omitted variable bias or incorrect functional form. Since all p-values are greater than 0.05, the model passes these key diagnostic tests, confirming that it is statistically reliable and well-specified.

Both CUSUM and CUSUM of Squares plots for both models illustrated in Figure 1 show blue lines within the red boundaries, the model is structurally stable, meaning the estimated nexus among variables do not change over time. This suggests that the long-run and short-run coefficients are reliable for making inferences.

5. Conclusion

The purpose of this study is to investigate the nexus between child maltreatment and female unemployment in Malaysia, with CPI acting as a moderating variable in this nexus. The ARDL approach was used to analyze data on GDP per capita, CPI, child abuse cases, and female unemployment rates from 1989 to 2021. The findings indicate a strong correlation

between inflation and child abuse cases. This suggests that a higher cost of living may lead to increased parental stress, as families struggle to afford basic necessities such as housing and food. Moreover, higher female unemployment rates appear to contribute to rising child abuse incidents, as financial instability and job insecurity may create additional pressure on mothers. When women are unemployed and face high living costs, they may experience emotional distress, leading to an increased risk of child maltreatment. Additionally, divorce can contribute to an increased risk of child abuse.

This study provides valuable insights into the link between female unemployment and child abuse, offering important implications for policymakers. To mitigate the risk of child abuse, the government should prioritize increasing employment opportunities for women. Expanding job creation initiatives, investing in skill development programs, and providing financial incentives for women entrepreneurs can help reduce female unemployment. Additionally, policies that promote flexible work arrangements, such as remote work or part-time employment, can support women in maintaining a work-life balance, reducing stress levels that may contribute to child maltreatment. Mental health support is also crucial, as unemployment can lead to anxiety and depression, increasing the risk of abusive behavior. The government should enhance access to mental health services for unemployed women and provide parenting support programs to help mothers cope with stress. Public awareness campaigns highlighting the link between female unemployment and child abuse can encourage community support and intervention. Strengthening social services, including economic assistance, childcare support, and family counseling, can further alleviate the pressures that unemployed mothers face. Regarding inflation, the government can implement contractionary fiscal or monetary policies to control price increases and reduce financial strain on households.

6. Limitations and future research directions

Despite its contributions, this study has several limitations. First, the analysis focuses solely on Malaysia, limiting the generalizability of the findings to other countries with different socio-economic structures. Future research could conduct comparative studies across multiple countries to examine whether similar patterns exist in different economic and cultural contexts. Second, this study primarily relies on macroeconomic indicators such as CPI, GDP, and female unemployment, without incorporating micro-level factors such as parental mental health, social support systems, or family dynamics. Future studies could use household-level data to provide a more comprehensive understanding of the mechanisms linking female unemployment and child abuse. Third, while the ARDL approach captures short- and long-run effects, it does not account for potential non-linear nexuses or threshold effects. Future research could explore alternative econometric methods, such as quantile regression or structural equation modeling, to assess whether the impact of unemployment on child abuse varies at different income levels or inflation thresholds. Finally, the study does not differentiate between different forms of child abuse (physical, emotional, sexual, or neglect), which may be influenced by unemployment and inflation in different ways. Future research should analyze how specific types of abuse are affected by economic conditions to provide more targeted policy recommendations. By addressing these limitations, future studies can further refine the understanding of the nexus between female unemployment, inflation, and child maltreatment, ultimately guiding more effective interventions to protect vulnerable children.

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Statement of declaration of interest

There are no conflicting interests to disclose, according to the authors.

Statement of data availability

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