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Family size and domestic violence in a high-fertility society

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ADB Working Paper Series

**FAMILY SIZE AND DOMESTIC VIOLENCE
IN A HIGH-FERTILITY SOCIETY**

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Abstract

Does family size affect the prevalence of domestic violence? Using nationally representative survey data from Samoa, which has among the world's highest fertility rates, I extend the classic work on child quantity–quality trade-offs to also consider domestic violence. Identification is based on instrumental variable (IV) strategies exploiting three distinct and plausibly exogenous drivers of additional fertility: (1) same-sex sibling pairs in families with two or more children; (2) multiple births (twin); and (3) a female firstborn. I find evidence of a direct causal link between family size and an increased prevalence of intimate partner violence by, on average, 5 percentage points, equivalent to a 13% increase from the mean. This significant effect is largely driven by physical or sexual abuse often associated with serious victim injuries. The IV estimates also suggest that larger families tend to have attitudes that condone violent behavior. The normalization of violent behavior in larger families may be linked to a lack of resources available to effectively address and resolve conflicts, ultimately contributing to an increased likelihood of violent incidents. These findings highlight the need for greater awareness of the potential victimization risks for larger families and the importance of integrated family planning and domestic violence prevention efforts.

Keywords: family size, domestic violence, instrumental variable

JEL Classification: D19, J13, J16, O10

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1. INTRODUCTION

The question of how family size impacts a household's socioeconomic status is a complex and long-standing debate. Since the pioneering work of Becker and Lewis (1973), and later Becker and Tomes (1976), numerous studies have investigated the relationship between the quality and quantity of children. Previous research (see Hanushek 1992; Leibowitz 1974; Parish and Willis 1993; Rosenzweig and Wolpin 1980) overwhelmingly supports the quantity–quality tradeoff argument, which suggests that an increase in the number of children leads to a tradeoff between the quantity and quality of each child's outcomes. However, early empirical studies focused more on revealing the correlation between family size and children's outcomes, which overlooked that factors such as parental preferences and household characteristics heavily influence both childbearing and child development (Browning 1992; Haveman and Wolfe 1995). This highlights the importance of accounting for omitted-variable bias and reverse causality in estimating the effects of childbearing, as emphasized by Angrist and Evans (1998).

Recent research on child quantity–quality tradeoffs has attempted to address the issue of endogeneity in various ways. One common approach involves utilizing exogenous variations in family size caused by the natural occurrence of twins to isolate the causal effect of family size on children's quality (see Angrist, Lavy, and Schlosser 2010; Black, Devereux, and Salvanes 2005; Rosenzweig and Wolpin 1980). Other measures of family size have also been proposed to address endogeneity, such as the gender composition of the first two children (Angrist, Lavy, and Schlosser 2010; Rosenzweig and Wolpin 2000) or the gender of the first child (Lee 2007). The instrumental variable (IV) strategies yield varying results in estimating the relationship between family size and child outcomes, depending on the instruments used and the country context. For example, by applying twin birth as the instrument, Li, Zhang, and Zhu, (2008) and Rosenzweig and Zhang (2009) find that having an extra child in the family significantly decreases child educational attainment in the People's Republic of China. However, using a combination of twins and sex-composition instruments, Angrist, Lavy, and Schlosser (2010) reveal that having more siblings does not negatively affect child outcomes in Israel. Similarly, using Norway's census data, Black, Devereux, and Salvanes (2005) ascertain that family size effects become negligible when including indicators for birth order or using twin births as an instrument. These findings indicate that the corresponding ordinary least squares (OLS) estimates are likely to be overestimated due to omitted variable bias.

Previous research on children's quantity–quality tradeoff has mainly focused on the effect of childbearing on children's health conditions, educational attainment, and labor market outcomes. However, this study aims to expand the discussion by examining the impact on domestic violence, which is often overlooked and understudied in developing countries. Domestic violence has been shown to have a severe negative impact on development outcomes, affecting families and communities, and straining healthcare, social services, and justice systems. Despite this, there is still a lack of studies examining the causal factors contributing to domestic violence, including how family size affects its prevalence. Based on the few available studies on this topic, researchers found a positive correlation between family size and domestic violence (Brinkerhoff and Lupri 1988; Ellsberg et al. 2001; Farrington 1989; Straus, Gelles, and Steinmetz 1980). A larger family is considered to be more likely to resort to violence due to the added pressure of providing for multiple children, which can cause immense stress and frustration (Hoffman, Demo, and Edwards 1994). Violence then becomes not only a possible but also a legitimate response to these pressures.

This study investigates the impact of family size on the prevalence of domestic violence in Samoa, a country with significantly higher rates of domestic violence and total fertility rate (TFR) than the global average. In Samoa, 43% of ever-married women aged 15–49 have experienced emotional, physical, or sexual violence committed by their partner, which is higher than the global average of 34%. Samoa's average fertility rate is also high at 4.0, compared to the global average of 2.3 and the average rate in lower middle-income countries of 2.6. Several factors, such as the high prevalence of child marriage and low contraceptive method adoption, contribute to Samoa's high total fertility rate. It is common for women in Samoa to have children at a relatively young age, with around 1 in 5 women aged 20 already giving birth to at least one child (United Nations Children's Fund 2017). Child marriage and early unions are also prevalent in the Pacific, with 1 in 4 women aged 20–24 marrying before the age of 18, which is higher than the average rate in the Asia and Pacific region (United Nations Population Fund 2021). Additionally, contraceptive adoption rates in the Pacific are significantly lower than the regional average, at only 20–30% compared to 60% in the Asia and the Pacific region (United Nations Population Fund 2021).

Using the nationally representative survey data from the Multiple Indicator Cluster Surveys (MICS) in Samoa, I examine the effects of having more children on the prevalence of domestic violence. To investigate the causal impact, the study employs an instrumental variable approach that uses three different instruments for family size: (1) same-sex sibling pairs in families with two or more children; (2) multiple births (twin); and (3) a female firstborn. The IV estimation results demonstrate a direct causal link between family size and the prevalence of intimate partner violence. A significant increase of 4.6 percentage points in the experience of any form of intimate partner violence corresponds to an 11% rise from the mean value. This concerning effect is primarily driven by physical or sexual forms of abuse, often associated with serious injuries suffered by the victims. The family size effect is also significant for the experience of intimate partner violence in the last 12 months, with an effect of 3.2 percentage points, about a 10% increase from the average value. The results also indicate that larger families tend to have attitudes that condone violent behavior. This finding may be attributed to a lack of resources available to address and resolve conflicts effectively within the larger family unit.

This paper makes three significant contributions to the literature on this topic. Firstly, to my knowledge, it is among the first studies to examine the causal link between childbearing and domestic violence in the Pacific region. Secondly, while previous studies have assumed that childbearing is an exogenous factor, using the instrumental variable approach allows for a more rigorous causal analysis by treating childbearing as endogenous and exploiting the exogenous variation through three distinct types of instruments. Finally, this paper provides evidence in the context of a high-fertility society, filling a gap in the literature and providing useful evidence for countries with similar circumstances. By shedding light on the relationship between family size and domestic violence, policymakers and researchers can better understand the factors affecting domestic violence. The findings of this causal effect analysis emphasize the need to raise awareness of the increased risk of victimization associated with larger families and the significance of integrating family planning and domestic violence prevention efforts.

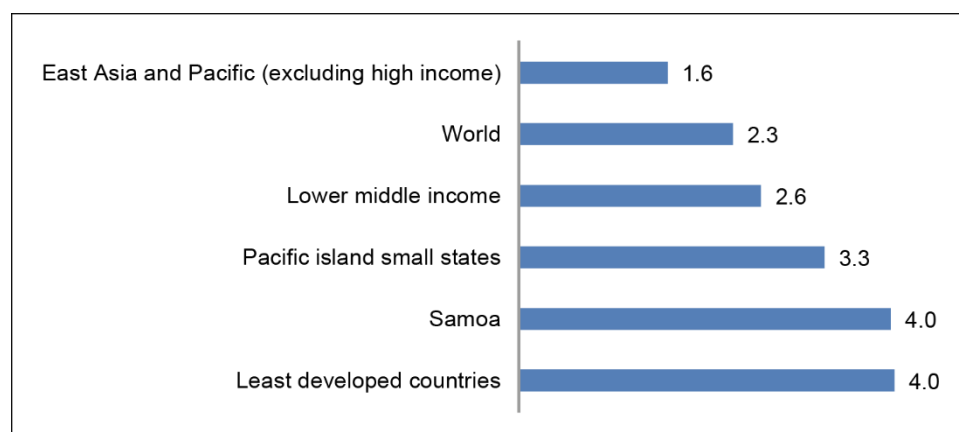
This paper will proceed as follows. Section 2 and Section 3 discuss the country's context and economic framework, explaining the relationship between family size and domestic violence. Sections 4 and 5 describe the data features and identification strategy utilized in this paper. The empirical findings are presented and discussed in Section 6. The paper concludes with policy implications in Section 7.

2. CONTEXT

Fertility, mortality, and migration are fundamental aspects of demographic statistics and key determinants of population growth and structure. Fertility rates refer to the average number of children born to women of childbearing age (usually defined as ages 15–49) in a given population. Access to healthcare and family planning services, as well as economic and social progress, can all impact fertility rates. A high fertility rate can have positive and negative effects depending on the context. Overpopulation, environmental stress, and higher infant mortality rates can result from high fertility rates in developing countries with scarce resources and underdeveloped healthcare. However, an aging population and a declining workforce may raise serious economic concerns in countries with low birth rates.

According to Figure 1, the average TFR in Samoa is 4.0, surpassing the global TFR average of 2.3 and the TFR of 2.6 recorded in lower middle-income countries (see Appendix Figure A.1 for a visualization of changes over time) (United Nations Population Division, 2022). This classifies Samoa as the very high fertility group, characterized by a TFR of 4.0 or higher. In the Pacific, social and religious norms play an important role in suppressing the demand for contraceptives, thus increasing fertility. Married women aged 15–49, in particular, commonly cite religion as the main reason for not intending to use contraception, followed by the fear of side effects and the desire to have as many children as possible. Furthermore, social norms stigmatizing out-of-marriage adolescent sexual behavior can hinder access to family planning services. There is also often little confidentiality in the health services as everyone knows everyone in the community, which can lead young people to risk ridicule or beatings when seeking contraceptives.

Figure 1: Total Fertility Rate (Births per Woman), 2021



Note: Pacific island small states include Fiji, Kiribati, the Marshall Islands, Federated States of Micronesia, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

Source: United Nations Population Division, 2022. Retrieved from <https://population.un.org/wpp/>.

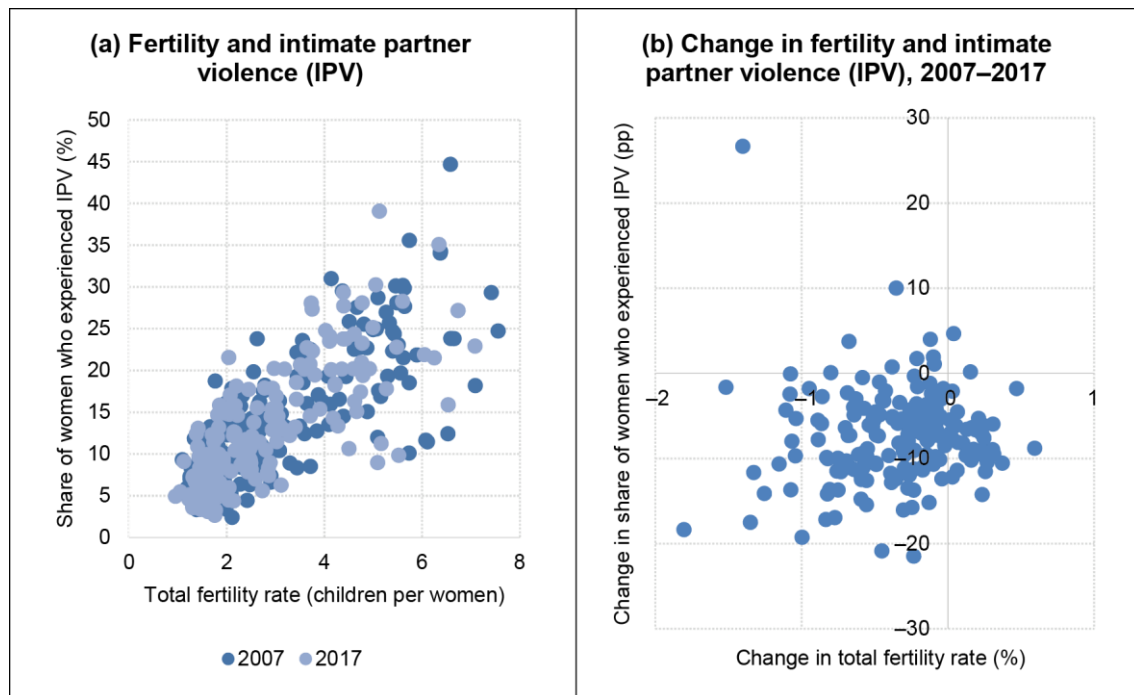
Children in the Pacific, like those in many other developing countries, are often raised in communities where extended families live in close proximity to one another, with each adult taking turns caring for and nurturing the children. As a result, children benefit from multiple care and protection networks, learning from other relatives and receiving care when their parents cannot meet their immediate needs. Across the Pacific, kinship care and informal adoption are common, with extended family members often stepping in to care for an orphaned child or a child whose parents cannot provide

adequate care. Extended families also represent vital safety nets, especially in the absence of a comprehensive social protection system. However, the extended family network is reportedly under increased strain in the Pacific countries, and larger households have been found to make children more vulnerable to poverty. For instance, the poverty rate for households with three or more children in Samoa is double the rate of those with only one child. (Household Income and Expenditure Survey 2020). When considering the role of the extended family, the impact of family size on domestic violence will have two contradictory effects. The high number of children, including those who are not biologically related, will increase the pressure on adults to meet their family's needs, which could lead to an increase in domestic violence. However, having extended families living in close proximity to one another could potentially ease the burden by allowing resource sharing between families, thus reducing stress and domestic violence incidents.

Studies conducted in the Pacific have revealed that violence against women is alarmingly widespread, with over 60% of women and girls experiencing violence at the hands of an intimate partner or family member. This rate is among the highest incidence of violence against women globally. Domestic violence against women violates their fundamental human rights, restricting their social, political, and economic participation. Moreover, it perpetuates the cycle of violence against the next generation, with children of women who have experienced violence more likely to suffer from emotional and behavioral issues, infant mortality, and to become violent perpetrators or victims. Children are also victims of domestic violence in the Pacific. Corporal punishment is still widely practiced, and children are exposed to relatively high levels of domestic violence, with an average prevalence of 77% (United Nations Children's Fund 2017). The normalization of violence as a form of punishment and discipline in many households and communities significantly contributes to violence against children. Furthermore, laws in all Pacific countries allow parents, teachers, and caretakers to use physical punishment as a form of "reasonable" discipline or correction, exacerbating the situation. A culture of silence regarding domestic and sexual violence is also a significant contributing factor to the vulnerable position of children, and it acts as a barrier to reporting and intervention.

3. ECONOMIC FRAMEWORKS

Building on the resource theory of violence (Blood and Wolfe 1960), Goode (1971) argues that a husband's use of physical force against his wife or other family members, such as children, can be considered a resource similar to money or personal attributes that can be used to deter unwanted actions or to induce desired behaviors. According to Goode (1971), the more resources a person has, the more force they can employ, but the less likely they will actually use violence. Violence is seen as a last resort when other methods of control have failed, and husbands may resort to violence when other means of control fail to produce the desired results. Thus, when other and more subtle methods of control fail to elicit submission, husbands resort to violence (Yllö and Bograd 1988). To test Goode's theory of violence as a resource, Allen and Straus (1975) used measures of extrinsic and intrinsic resources, such as occupational prestige, educational level, income, and satisfaction with income. Their study found that low socioeconomic status was significantly associated with the husband's use of physical force. Other studies have also found that husbands with fewer resources are more likely to physically abuse their wives (Browker 1983; Pagelow 1981).

Figure 2: Fertility and Intimate Partner Violence (IPV)

Source: Institute for Health Metrics and Evaluation (IHME) and United Nations Population Division, 2022. Retrieved from <https://www.healthdata.org/> and <https://population.un.org/wpp/>.

The resource theory suggests that various factors can predict the likelihood of domestic violence, including socioeconomic status, status inconsistency, and the number of children in a family (Hoffman, Demo, and Edwards 1994). While abuse can occur in all socioeconomic classes, it is more common and severe in lower socioeconomic groups, where frustration and stress tend to be more prevalent due to limited resources (Gelles and Straus 1988; Hotelling and Sugarman 1986, 1990). In some cases, status inconsistency, where one spouse has a higher status than the other, can also lead to domestic violence. Studies have shown that domestic violence is more common when the wife has a higher status at work than her husband (Gelles 1974; O'Brien 1971), particularly in patriarchal societies where husbands may feel threatened by their wives' educational or occupational advantages (Yllö and Bograd 1988). Children also have a significant impact on family resources, with wife abuse reported in 80% of families who have children (Fagan, Stewart, and Hansen 1983). As the number of children in a family grows, so does the financial burden and time needed to care for them, leading to increased parental stress. Research has found a positive linear relationship between family size and domestic violence (Brinkerhoff and Lupri 1988; Ellsberg et al. 2001; Farrington 1989; Straus et al. 1980), with larger families being more likely to resort to violence due to the pressure to provide for multiple children. Figure 2 (Panel a) demonstrates a positive correlation between fertility rates and intimate partner violence (IPV) across countries. However, there is also encouraging progress in Figure 2 (Panel b), where a decrease in fertility rates is accompanied by a decrease in IPV over the ten years between 2007 and 2017. This suggests that efforts to reduce fertility rates may positively impact reducing the prevalence of domestic violence.

4. DATA

The primary dataset used in this study is derived from the Samoa Multiple Indicator Cluster Survey (MICS) conducted in 2019–2020. The MICS dataset provides rich and comprehensive information on household and individual demographic characteristics, making it an ideal source for examining the effects of family size on domestic violence. The survey is designed to produce accurate and statistically reliable estimates of key indicators at the national level, for urban and rural areas, and the four regions of the country: Apia Urban Area; North-West Upolu; Rest of Upolu; and Savaii. The survey utilized a multistage, stratified cluster sampling approach to select its survey sample. The sampling frame for the survey was based on the 2016 Samoa Census of Population and Housing, which provided a comprehensive list of households across the country. The sample size for the Samoa MICS 2019–2020 was calculated as 3,675 households (10% of the total number of households in the 2016 census, which was 28,880, with an 18% adjustment upwards to cater for anticipated non-response).

This paper focuses on domestic violence against women inflicted by their spouse/partner. The survey selected one eligible woman per household sampled—aged between 15 and 49 who is, or has been, married, or who is, or has been, living with a man in an intimate relationship—to answer questions on violence perpetrated by a current or former husband or cohabiting partner. A total of 1,567 women aged 15–49 years were interviewed for the spousal violence questionnaire, yielding a response rate of 100%. Given the sensitive nature of the questions, maintaining the confidentiality and adhering to ethical guidelines was crucial. The survey took measures to protect the respondents' identities and ensure their safety by developing a protection protocol/support plan to minimize any potential distress the participants may experience during the interview process. The interview will only continue until privacy is ensured with sensibly managed interruptions. The domestic violence module collects information about the prevalence and consequence of violence, spousal controlling and drinking behavior, help-seeking behavior, and attitudes towards violence. Table 1 presents the summary statistics of the sample.

In the context of spousal violence, it is essential to consider the different types of abuse inflicted by a current or former partner. The three primary categories of spousal violence include emotional, physical, and sexual violence. *Emotional violence* entails a systematic pattern of degrading and humiliating conduct that aims to intimidate or harass the victim through threats, verbal abuse, or constant humiliation. To gauge the prevalence of emotional violence, survey questions were designed to inquire whether the woman experienced any verbal or physical humiliation in front of other people, whether she was threatened with harm or insulted and belittled. *Physical violence*, meanwhile, involves any conduct that causes bodily pain, harm, or endangers the victim's life and health. The specific acts that were asked about included pushing, throwing objects, smacking, slapping, twisting of the arm, pulling of the hair, punching, kicking, dragging on the floor, strangling, burning, and attacking with a weapon, such as a knife or a firearm. Finally, *sexual violence* refers to any form of abuse of a sexual nature that is abusive, humiliating, degrading, or otherwise infringes upon the victim's dignity. The survey questions regarding sexual violence aimed to determine whether the woman was subjected to sexual violence through threats, intimidation, or by any violent means, including physical, without her consent.

Table 1: Summary Statistics

	By Family Size						
	Full Sample		No Child	One Child	Two Children	Three Children	Four or More Children
	Mean	(Std. Dev.)	Mean				
Age	35.14	(8.17)	35.24	35.01	34.09	34.79	36.18
Education level							
No education	0.01	(0.12)	0.02	0.02	0.01	0.02	0.02
Primary	0.03	(0.16)	0.01	0.03	0.01	0.05	0.04
Secondary	0.70	(0.45)	0.65	0.70	0.68	0.69	0.75
Tertiary	0.25	(0.43)	0.32	0.25	0.30	0.25	0.20
Urban	0.24	(0.42)	0.22	0.21	0.25	0.27	0.25
Labor force participation	0.26	(0.44)	0.37	0.29	0.25	0.25	0.21
Underage marriage	0.11	(0.31)	0.07	0.10	0.09	0.11	0.15
Cohabitation	0.20	(0.39)	0.29	0.23	0.20	0.16	0.17
Egalitarian relationship	0.63	(0.48)	0.57	0.56	0.62	0.68	0.67
Homogamous education	0.62	(0.48)	0.55	0.63	0.67	0.66	0.59
Wealth index quintile							
Poorest	0.21	(0.40)	0.16	0.17	0.19	0.20	0.28
Second	0.18	(0.38)	0.16	0.19	0.15	0.20	0.20
Middle	0.17	(0.37)	0.15	0.19	0.19	0.16	0.18
Fourth	0.22	(0.41)	0.24	0.24	0.22	0.25	0.18
Richest	0.21	(0.40)	0.29	0.21	0.25	0.20	0.16
Spousal emotional violence in a lifetime	0.21	(0.40)	0.17	0.23	0.18	0.22	0.22
Spousal emotional violence in the last 12 months	0.17	(0.37)	0.12	0.18	0.14	0.19	0.19
Spousal physical violence in a lifetime	0.27	(0.44)	0.24	0.25	0.27	0.29	0.27
Spousal physical violence in the last 12 months	0.19	(0.38)	0.17	0.17	0.20	0.20	0.18
Spousal sexual violence in a lifetime	0.17	(0.37)	0.12	0.14	0.16	0.22	0.18
Spousal sexual violence in the last 12 months	0.15	(0.35)	0.10	0.11	0.13	0.19	0.16
Spousal physical or sexual violence in a lifetime	0.34	(0.47)	0.29	0.30	0.36	0.38	0.34
Spousal physical or sexual violence in the last 12 months	0.27	(0.44)	0.21	0.23	0.29	0.31	0.27
Any spousal violence in a lifetime	0.39	(0.48)	0.32	0.36	0.42	0.42	0.40
Any spousal violence in the last 12 months	0.32	(0.46)	0.25	0.27	0.33	0.36	0.33
Serious injuries due to spousal violence	0.11	(0.3)	0.12	0.09	0.09	0.12	0.11
Controlling spouse	0.80	(0.40)	0.75	0.81	0.82	0.81	0.79
Spouse is sometimes/often drunk	0.49	(0.50)	0.43	0.50	0.48	0.50	0.52
Afraid of spouse	0.20	(0.40)	0.15	0.24	0.20	0.18	0.23
Seek any help	0.25	(0.43)	0.25	0.26	0.23	0.24	0.27
Women's attitude justifying domestic violence	0.38	(0.48)	0.33	0.34	0.41	0.40	0.41
No. of children (total)	2.59	(1.75)	0.00	1.00	2.00	3.00	4.81
No. of children (<=5 years old)	1.06	(1.02)	0.00	0.52	1.03	1.33	1.66
No. of children (6–17 years old)	1.53	(1.48)	0.00	0.48	0.97	1.67	3.15
Having same-sex sibling pair	0.35	(0.47)	0.00	0.00	0.44	0.55	0.52
Having multiple births (twin)	0.04	(0.19)	0.00	0.01	0.02	0.04	0.09
Having female firstborn	0.40	(0.48)	0.00	0.49	0.44	0.47	0.42
Observations of ever-married women aged 15–49 years	1,567		185	289	319	328	446

5. IDENTIFICATION STRATEGY

This study employs a quasi-experimental research design based on IV to address the potential endogeneity issue. I use three distinct instruments as exogenous sources of variation of family size: (1) a dummy variable for same-sex sibling pairs in families with two or more children; (2) a dummy variable for multiple births (twin); and (3) a dummy of a female firstborn. These three IVs are well-established in the literature and have been shown to be effective in controlling for endogeneity issues when estimating the impact of family size on various outcomes. This combination of IVs will address potential confounding factors and isolate the causal impact of family size on domestic violence.

The empirical analysis focuses on examining the effect of family size on the prevalence of IPV based on the following structural form specification:

$$Y_i = \alpha_0 + X_i' \alpha_1 + \beta F_i + \varepsilon_i \quad (1)$$

where Y_i refers to the outcome variables of IPV (i.e., ever experienced emotional, physical, sexual, or any of the three forms of violence by their husband/partner). F_i is the independent variable of interest, the number of children who are younger than or equal to 17 years old, which is endogenous and is instrumented by the IVs. The specification also controls individual and household characteristics, including age, dummy of education level, labor force participation, underage marriage, cohabitation status, egalitarian relationship, homogamous education, and household wealth index quintile. The regression also controls for region fixed effects to account for unobserved heterogeneity across regions that could affect the results. The estimation is clustered at the enumeration areas to address any potential serial correlation.

The IV regression is estimated using two-stage least squares (2SLS). In the first stage, the number of children less than or equal to 17 years old, F_i , is regressed on the instruments, which are the exogenous variation of F_i affecting Y_i and uncorrelated with ε_i . The first stage of the IV regression is as follows:

$$\hat{F}_i = \delta_0 + X_i' \delta_1 + Z_i' \tau + v_i \quad (2)$$

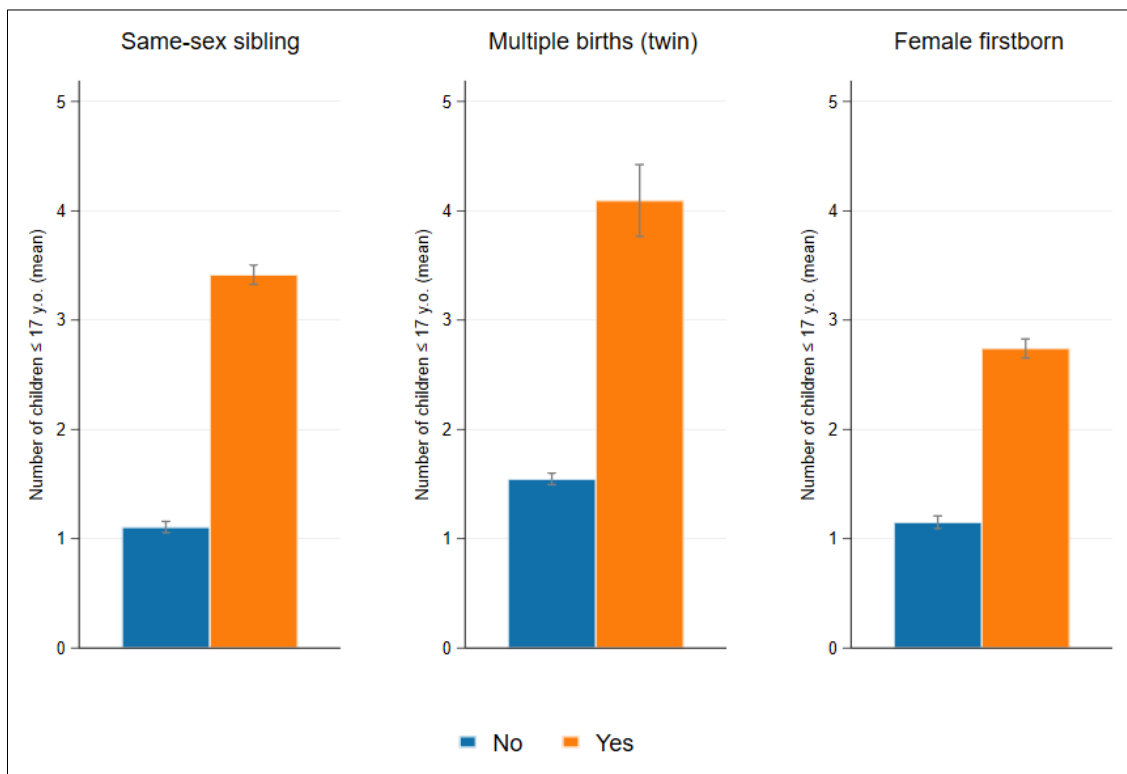
and the second stage is as follows:

$$Y_i = \alpha_0 + X_i' \alpha_1 + \beta \hat{F}_i + \varepsilon_i \quad (3)$$

Z_i are the IVs that predict the number of children less than 17 years old in the family. For the instruments to be valid, they should have a strong correlation with the endogenous variable and have no independent effect on the outcome variable, aside from their indirect influence through the endogenous variable. *Same-sex sibling pair* is considered as a plausibly exogenous variation of family size. Research has shown that parents are significantly more likely to have another child if the first two children are of the same sex, due to their preference for a mixed sibling sex composition (Angrist and Evans 1998; Ben-Porath and Welch 1976). *Multiple births*, such as twin births, are also one potential IV that meets these criteria because the occurrence of multiple births is unlikely to depend on family background or parental planning. Rather, twin births are largely determined by chance, making them a plausibly exogenous variation of family size. *Female firstborn* is also associated with larger family size when society has a preference for sons over daughters. If the first child is not a son and the parents would prefer to have at least one son, they are more likely to attempt to have another child

(Lee 2007). A strong preference for sons is commonly seen in the Pacific due to the patriarchal societal structure where daughters are viewed as a source of financial hardship for the family, whereas sons are viewed as a source of benefit. As shown by the stylized correlation in Figure 3, there is a strong correlation between the instruments and the endogenous variable.

Figure 3: Correlation Between the Instruments and Endogenous Treatment



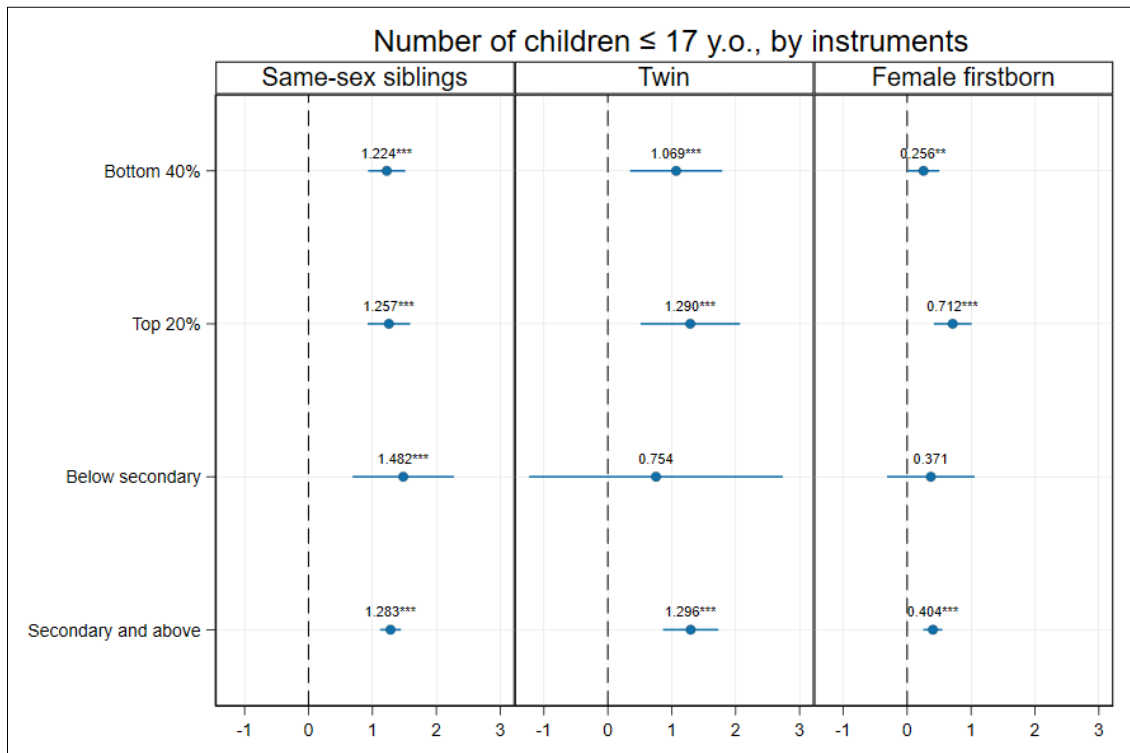
Nevertheless, each of the three instruments has potential limitations and caveats that may introduce omitted-variable biases. Using *same-sex sibling pairs* as an instrument may face challenges related to household resource sharing. For example, Rosenzweig and Wolpin (2000) suggest that sex composition may influence outcomes due to economies of scale for household resources. Same-sex sibling pairs may improve household efficiencies and reduce household tension, leading to better household outcomes and reduced occurrence of domestic violence. However, this assumes that household resources are shared equally among all family members, which may not always be the case. Moreover, households with same-sex sibling pairs may have a greater sense of kinship or bonding between siblings, which could lead to greater cooperation and sharing of resources. While using *twin births* as an instrument is plausible, it is important to note that the rate of twin births varies based on maternal characteristics, such as age and race, and parents may selectively opt for assisted reproduction methods, which may not be entirely random. Additionally, twin births may not be a suitable instrument in cases where child spacing affects violence since there is no space between twins. Furthermore, using *female firstborn* as an instrument may face challenges related to cultural biases and gender discrimination. The occurrence of the first child being female may exacerbate these gender biases and increase the risk of domestic violence and other negative household outcomes.

To overcome the potential limitations of the instruments used in the analysis, the regressions establish identification based on conditional instruments while controlling for various demographic and socioeconomic characteristics. Specifically, the analysis includes control variables, such as age, education level, labor force participation, underage marriage, cohabitation status, egalitarian relationship, homogamous education, and household wealth index quintile, which can help to mitigate the impact of omitted variables and improve the robustness of the estimates. Moreover, using multiple instruments can enhance the validity of the analysis and the accuracy of the estimated effects by accounting for potential confounding factors that may impact one instrument but not others. This approach can effectively reduce the possibility of bias due to omitted variables, thereby enhancing the overall validity of the instruments. Additionally, using a combination of IVs can also provide greater statistical power, which can help to identify the causal effects of family size on domestic violence more accurately. Together, these strategies can help overcome the instruments' limitations and improve the validity of the findings.

6. EMPIRICAL RESULTS AND ANALYSIS

6.1 First-stage Estimates

In order to ensure the instrument relevance condition, I first evaluate the correlation between the endogenous variable and the three potential IVs—same-sex sibling pairs, multiple births (twin), and female firstborn. This analysis is presented in Table 2, which illustrates the first-stage estimates of the IV regressions. The results show that each instrument is significant and positively correlated with the endogenous variable, indicating a strong correlation between the two variables. I also perform a regression analysis of the dependent variable against all three instruments simultaneously. The statistical significance of the results remains unchanged, and the coefficients remain consistent, regardless of whether additional covariates are included in our analysis. First-stage F-statistics of all instruments, individually or in combination, are well above 30, providing compelling evidence for the instruments' relevance and ability to predict the endogenous variable. A strong first-stage IV is essential in minimizing the attenuation bias and ensuring the accuracy of the IV estimates. Moreover, the heterogeneity analysis of the first-stage estimates based on the household wealth index and female's education level (Figure 4) shows point estimates and significance levels that are relatively consistent across subsamples.

Figure 4: First-stage Heterogeneity in Response to the Instruments

Note: Dependent variable is the number of children who are less or equal to 17 years old. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 2: First-stage Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: No. of Children (≤ 17 y.o.)								
Same-sex siblings	1.445*** (0.080)	1.368*** (0.081)					1.384*** (0.080)	1.310*** (0.082)
Twin			1.699*** (0.212)	1.621*** (0.206)			1.340*** (0.224)	1.278*** (0.216)
Female firstborn					0.476*** (0.081)	0.474*** (0.080)	0.408*** (0.075)	0.411*** (0.074)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204	204	204
Kleibergen–Paap rk Wald F stat	323.66	283.09	64.11	61.68	34.59	35.12	124.68	109.07
Cragg–Donald Wald F-stat	288.37	266.98	59.88	57.12	28.18	29.56	124.76	117.01

Note: Dependent variable is the number of children who are less or equal to 17 years old. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Covariates controlled include age, dummy of education level, household wealth index, underage marriage, marital status, and homogenous education.

6.2 Main Results

Table 3 presents the key findings examining the relationship between family size and the prevalence of any form of female domestic violence perpetrated by intimate partners over a lifetime and within the past 12 months. By utilizing three different instruments (Columns 7 and 8), we were able to assess the causal impact of family size on IPV. Using three different instruments simultaneously, the IV regression suggests that the number of children increases the probability of ever experiencing any form of IPV during a lifetime. On average, the likelihood of experiencing lifetime IPV increased by 5 percentage points, equivalent to a 13% increase from the average value. The results also highlight a continued causal link between family size and the experience of IPV in the past 12 months, albeit with a smaller effect size of 3.7 percentage points (a 12% increase from the mean). This suggests that the number of children may still contribute to shaping the risk of experiencing IPV, even in the more recent past. Although the magnitude of the effect is reduced compared to that observed for lifetime IPV, it remains statistically significant and underscores the importance of considering family structure and dynamics when examining the risk of IPV. The p-value of the overidentification test for the instrumental variable is not statistically significant, indicating no evidence to reject the null hypothesis that the instruments are exogenous.

As shown in Table 3 (Columns 1 to 6), I find that using the same-sex sibling as an instrument produces results that are similar to those obtained when using all three instruments simultaneously. However, when using only twins or female firstborn as instruments, there is no detectable effect of the number of children on the prevalence of violence at the 5% level. It is well-established that the selection of instruments can significantly impact the results of instrumental variable analyses since they capture different sources of exogenous variation and may have varying levels of correlation with the independent variable. Hence, it is crucial to examine the relationship between the first-stage effects impacted by each underlying natural experiment, as well as the connection between the first-stage effects and the extent of variation induced by each instrument. For all specifications in Table 3, the standard errors in parentheses suggest that the estimates are precise, with a small margin of error. The magnitude of the coefficients is relatively small, but it is important to note that the instruments used in the regression model are categorical variables, so a one-unit increase in the number of children may not necessarily correspond to a one-unit increase in the probability of experiencing IPV. This is because the relationship between the categorical instrument and the dependent variable is not necessarily linear, and there may be a threshold effect or nonlinear relationship.

Table 3: Family Size and Domestic Violence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Experienced any IPV (Emotional, Physical, or Sexual) During a Lifetime								
Instrument:	Same-sex Sibling		Twin		Female First Child		Three Instruments	
No. of children	0.043*** (0.017)	0.048*** (0.017)	0.035 (0.037)	0.038 (0.038)	0.078 (0.054)	0.079 (0.054)	0.045*** (0.016)	0.050*** (0.017)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204	204	204
F-stat	3.68	4.24	2.18	3.64	2.41	3.92	3.86	4.29
Overidentification test (p-value)							0.78	0.80
Endogeneity test (p-value)	0.06	0.03	0.57	0.52	0.23	0.22	0.04	0.02
B. Experienced any IPV (Emotional, Physical, or Sexual) in the Last 12 Months								
Instrument:	Same-sex Sibling		Twin		Female First Child		Three Instruments	
No. of children	0.022 (0.016)	0.025 (0.017)	0.063* (0.036)	0.071** (0.036)	0.089* (0.050)	0.086* (0.050)	0.033** (0.015)	0.037** (0.016)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204	204	204
F-stat	2.23	4.58	2.33	4.31	2.46	4.88	2.85	4.88
Overidentification test (p-value)							0.25	0.27
Endogeneity test (p-value)	0.85	0.70	0.21	0.14	0.14	0.15	0.37	0.24

Note: Dependent variable is the prevalence of any forms of female domestic violence (emotional, physical, or sexual) perpetrated by intimate partners, both over a lifetime and within the past 12 months. Covariates controlled include age, dummy of education level, labor force participation, under-age marriage, marital status, egalitarian relationship, homogamous education, and household wealth index. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4: OLS, Reduced Form, and 2SLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
A. Experienced Any IPV (Emotional, Physical, or Sexual) During a Lifetime						
	OLS		Reduced Form		2SLS	
No. of children	0.015** (0.007)	0.014** (0.007)			0.045*** (0.016)	0.050*** (0.017)
Same-sex siblings			0.060** (0.024)	0.063*** (0.023)		
Twin			0.042 (0.062)	0.043 (0.061)		
Female first child			0.034 (0.025)	0.035 (0.024)		
Covariates	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204
F-stat	3.51	3.96	2.87	4.12	3.86	4.29
Overidentification test (p-value)					0.78	0.80
Endogeneity test (p-value)					0.04	0.02

continued on next page

Table 4 *continued*

	(1)	(2)	(3)	(4)	(5)	(6)
	B. Experienced any IPV (Emotional, Physical, or Sexual) in the Last 12 Months					
	OLS		Reduced Form		2SLS	
No. of children	0.019*** (0.007)	0.019*** (0.007)			0.033** (0.015)	0.037** (0.016)
Same-sex siblings			0.027 (0.024)	0.029 (0.023)		
Twin			0.096 (0.060)	0.103* (0.058)		
Female first child			0.039* (0.023)	0.038* (0.023)		
Covariates	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204
F-stat	3.82	4.94	2.24	4.63	2.85	4.88
Overidentification test (p-value)					0.25	0.27
Endogeneity test (p-value)					0.37	0.24

Note: Dependent variable is the prevalence of any forms of female domestic violence (emotional, physical, or sexual) perpetrated by intimate partners, both over a lifetime and within the past 12 months. The IV 2SLS estimation uses three instruments, including same-sex siblings, twin, and female first child. Covariates controlled include age, dummy of education level, under-age marriage, marital status, homogamous education, and household wealth index. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4 displays a comprehensive analysis of the impact of family size on domestic violence, presenting results from OLS, reduced form, and 2SLS models. The OLS estimates in Columns 1 and 2 highlight a significant positive relationship between family size and domestic violence, regardless of the dependent variable and specification used. These findings suggest that an increase in the number of children in a family raises the likelihood of experiencing IPV for women, as indicated by the OLS coefficients, which suggest a rise of approximately 1.4 percentage points during lifetime and 1.9 percentage points in the last 12 months for every additional child in the family, all other factors held constant. The reduced form in Columns 3 and 4 estimates the direct effect of the instruments on the outcome variable, without considering the endogenous variable. The results indicate a positive correlation between same-sex siblings and women's experience of IPV during their lifetime. However, no reduced-form relation exists between twin and female firstborn instruments and any outcome variables, with or without covariates. Since the first-stage estimation in Table 2 shows evidence of strong instruments, the nonsignificance in the reduced form regression should not be taken as a sufficient condition for the weak instrument.¹ The reduced form regression estimates the total effect of the instruments on the outcome variable, which includes both the direct effect of the instruments and the indirect effect of the instruments through the endogenous variable.²

¹ The significant results in the second stage of IV are due to the part of the instruments that is fitted by the regressor, while in the reduced form, the part of the instrument that is not explained by the regressor also plays a role.

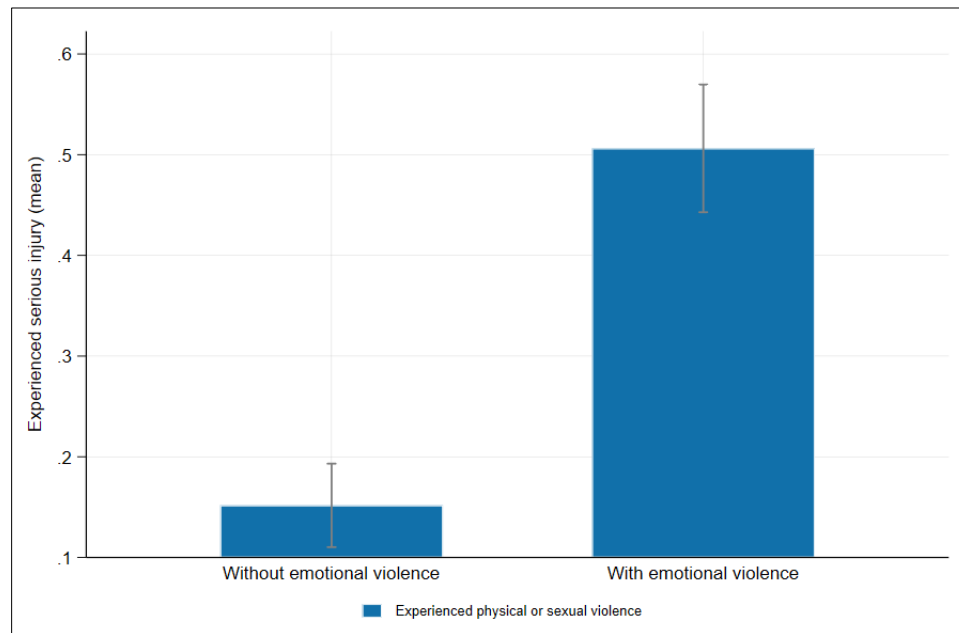
² Given that the assignment of treatment may rely on an instrumental variable, the reduced form regression can serve as a method of estimating the intention-to-treat (ITT) effect.

Furthermore, the analysis in Table 4 reveals that the estimation outcomes obtained through the 2SLS method are larger than those derived from the OLS estimation. This discrepancy indicates that OLS estimation may underestimate the true effect of family size on domestic violence, due to potential bias stemming from omitted variables. This occurs when relevant factors that influence the outcome variable are not included in the model, leading to biased estimates of the coefficients. The 2SLS method, on the other hand, utilizes IVs to account for the potential endogeneity of the explanatory variable and mitigate omitted variable bias. Therefore, the larger estimates produced by the 2SLS method suggest that this approach provides a more accurate and reliable estimation of the true causal effect of family size on domestic violence. The 2SLS estimate with covariates yields a slightly larger magnitude than when covariates are not included. This result indicates the precision and accuracy of using conditional instruments that account for the covariates. Incorporating covariates into the 2SLS estimation mitigates potential direct relationships between the instruments and outcome variables. By conditioning on relevant covariates, the instruments can be better targeted towards the endogenous variable, thereby reducing the likelihood of biased estimates.

6.3 Additional Results and Mechanisms

Table 5 displays the 2SLS results examining the relationship between family size and different types of violence, including emotional, physical, sexual, and physical or sexual violence. The results indicate that family size has a statistically significant effect on IPV, which is largely driven by physical or sexual forms of abuse. This finding is particularly concerning since physical or sexual violence is often associated with severe victim injuries, which can have long-lasting physical, emotional, and psychological consequences for the survivor. According to Samoa MICS 2019–2020, a concerning 30% of women who had undergone physical or sexual violence had experienced serious injury. This statistic highlights the devastating impact of violence against women on their physical well-being. Moreover, as shown in Figure 5, the likelihood of severe injury significantly increases when physical or sexual violence is accompanied by emotional abuse. In such cases, nearly half of the women who experienced violence suffered serious injury as a result of their partner's actions.

The number of children a woman has may have a broader impact than just the occurrence of violence, as it can also directly affect some of its consequences. For example, women with more children may be less likely to leave an abusive relationship due to concerns about their children's safety and wellbeing, which can lead to prolonged exposure to violence and increased risk of serious injury. However, on the other hand, having children can also motivate women to seek help or leave an abusive situation to protect their children. Women may feel a greater sense of responsibility to ensure the safety and wellbeing of their children, which can motivate them to take action and seek support. Furthermore, having children may also impact the type of abuse a woman experiences. For example, an abuser may use the children as leverage or threaten to harm them as a way to control and intimidate the woman. This can be particularly traumatic for the woman and impact her willingness to seek help or leave the relationship. The results presented in Table 6, Panel A suggest that there is no significant evidence of a causal relationship between the number of children and the consequences of domestic violence experienced by women. Contrary to some prior hypotheses, the study finds no evidence to support the notion that having more children is associated with an increased fear of the spouse, an increased likelihood of experiencing a serious injury, or a greater willingness to seek help.

Figure 5: Women's Experience of Serious Injury Due to Physical or Sexual Violence**Table 5: 2SLS Estimates by Types of Violence**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IV 2SLS (with Three Instruments)								
A. Experienced IPV During a Lifetime								
	Emotional		Physical		Sexual		Physical or Sexual	
No. of children	0.019 (0.014)	0.022 (0.014)	0.027* (0.015)	0.033** (0.015)	0.017 (0.012)	0.017 (0.013)	0.033** (0.015)	0.038** (0.016)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204	204	204
2SLS F-stat	1.26	3.08	2.49	3.93	1.33	4.19	2.97	4.52
Overidentification test (p-value)	0.62	0.62	0.42	0.44	0.60	0.67	0.63	0.59
Endogeneity test (p-value)	0.47	0.36	0.21	0.14	0.78	0.66	0.14	0.09
B. Experienced IPV in the last 12 months								
	Emotional		Physical		Sexual		Physical or Sexual	
No. of children	0.021 (0.014)	0.023* (0.014)	0.011 (0.013)	0.016 (0.014)	0.012 (0.011)	0.012 (0.012)	0.023* (0.013)	0.028** (0.013)
Covariates	No	Yes	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204	204	204
2SLS F-stat	1.20	2.99	0.89	5.64	1.51	4.18	2.37	5.18
Overidentification test (p-value)	0.28	0.32	0.23	0.27	0.64	0.68	0.67	0.69
Endogeneity test (p-value)	0.55	0.44	0.86	0.67	0.79	0.87	0.51	0.38

Note: Dependent variable is the prevalence of female domestic violence perpetrated by intimate partners by types of violence, both over a lifetime and within the past 12 months. The IV 2SLS estimation uses three instruments, including same-sex siblings, twin, and female first child. Covariates controlled include age, dummy of education level, under-age marriage, marital status, homogamous education, and household wealth index. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Additional Results

	(1)	(2)	(3)	(4)	(5)	(6)
IV 2SLS (with Three Instruments)						
Panel A						
	Afraid of Spouse		Serious Injury		Seek Help	
No. of children	0.019 (0.014)	0.021 (0.014)	0.007 (0.010)	0.010 (0.010)	0.003 (0.015)	0.006 (0.015)
Covariates	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204
2SLS F-stat	1.50	4.08	0.45	2.13	1.71	5.73
Overidentification test (p-value)	0.30	0.26	0.66	0.72	0.23	0.22
Endogeneity test (p-value)	0.49	0.38	0.78	0.66	0.98	0.74
Panel B						
	Women's Attitude Justifying Domestic Violence		Female Labor Force Participation		Egalitarian Decision Making	
No. of children	0.038** (0.017)	0.037** (0.018)	-0.043*** (0.014)	-0.042*** (0.014)	0.017 (0.017)	0.012 (0.017)
Covariates	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,567	1,567	1,567	1,567	1,567	1,567
Cluster	204	204	204	204	204	204
2SLS F-stat	11.06	5.58	21.37	18.81	5.47	4.54
Overidentification test (p-value)	0.99	0.99	0.29	0.21	0.33	0.34
Endogeneity test (p-value)	0.16	0.14	0.27	0.15	0.93	0.93
Panel C						
	Men's Attitude Justifying Domestic Violence		Coercive Control		Spouse is Often Drunk	
No. of children	0.015 (0.011)	0.027 (0.018)	0.013 (0.012)	0.013 (0.013)	0.016 (0.017)	0.022 (0.018)
Covariates	No	Yes	No	Yes	No	Yes
Region fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,198	1,198	1,567	1,567	1,567	1,567
Cluster	202	202	204	204	204	204
2SLS F-stat	10.77	3.57	0.78	4.78	1.54	2.70
Overidentification test (p-value)	0.07	0.06	0.98	1.00	0.08	0.09
Endogeneity test (p-value)	0.54	0.55	0.42	0.32	0.73	0.71

Note: Dependent variable is the prevalence of female domestic violence perpetrated by intimate partners by types of violence, both over a lifetime and within the past 12 months. The IV 2SLS estimation uses three instruments, including same-sex siblings, twin, and female first child. Covariates controlled include age, dummy of education level, under-age marriage, marital status, homogamous education, and household wealth index. Standard errors clustered at the enumeration areas are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In addition to examining the direct impact of the number of children on the prevalence of domestic violence, I also explore the potential mediating factors contributing to this phenomenon from both the victim and perpetrator perspectives. The findings in Table 6, Panels B and C reveal that the number of children a woman has can increase her attitudes justifying domestic violence.³ However, no evidence suggests that the number of children impacts men's attitudes justifying domestic violence. The significant positive relationship between the number of children and women's attitudes towards domestic violence suggests that women with more children tend to be more accepting of domestic violence, potentially as a means of resolving conflicts in their relationships. The more children a woman has, the more likely she may feel that her husband's physical violence is justifiable, even in situations that would otherwise be considered unjustifiable. This relationship may reflect cultural or social norms that prioritize the preservation of the family unit over individual rights or safety. Women with more children may also experience greater stress due to the demands of parenting, financial pressures, and household responsibilities. These stressors can create tension in relationships and may lead to an increased tolerance for violence to resolve conflicts. Moreover, women with more children may be more economically dependent on their partners or spouses and less able to leave an abusive relationship due to financial constraints. This dependence can make them more tolerant of domestic violence as they may feel they have no choice.

The results in Table 6 also show significant evidence that having more children decreases female labor force participation. In particular, I find that each additional child reduces the likelihood of women being in the labor force by approximately 4 percentage points, equivalent to a 15% decrease from the mean value. This implies that having more children can limit women's opportunities to participate in the labor force, potentially due to the increased demands of childcare, which make it difficult for women to balance work and family responsibilities. The decrease in women's participation in the labor force due to more children can have adverse effects, including limiting their financial independence and leaving them economically vulnerable. This can also limit their ability to leave abusive relationships, as they may lack the financial resources to support themselves and their children independently. It is essential to conduct further research to explore how offering support to women with children who aspire to join or remain in the workforce, through initiatives like affordable childcare and flexible work arrangements can increase their participation rates and potentially decrease the prevalence of domestic violence.

As indicated in Table 6, the number of children does not seem to directly affect the level of control that the perpetrator has over the victim, the decision-making dynamics in the relationship, or the frequency of alcohol consumption by the perpetrator. Although these outcomes are often linked to increased stress and conflict, which can lead to domestic violence, they may not fully capture the level of stress or conflict in the relationship. Future research could consider utilizing measures that could capture this mechanism more accurately. For example, assessments of economic stress, mental health, and substance abuse could provide a more comprehensive understanding of this channel of domestic violence.

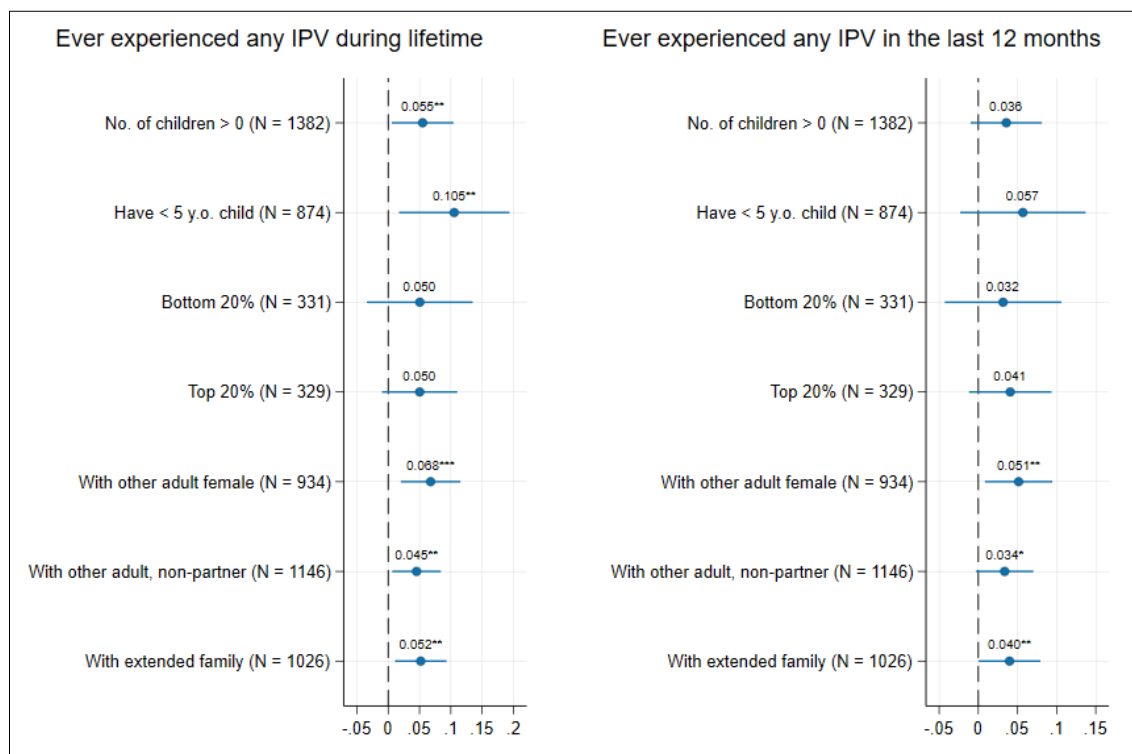
³ Attitude justifying domestic violence measures the perceptions of women or men towards domestic violence and reflects their beliefs about the circumstances under which their husbands or partners are justified in using violence against them. Specifically, women and men were asked to indicate whether men are justified in hitting or beating women if women went out without informing them, neglected their children, argued with them, refused sex, or burnt the food.

6.4 Heterogenous Effects

6.4.1 Household Characteristics

Figure 6 presents the heterogenous effects analysis to examine the relationship between family size and domestic violence, both in a lifetime context and within the last 12 months. The analysis takes into account various demographic characteristics. The aim is to investigate whether different effects exist based on the number of children, the presence of children under 5 years old, and the household wealth index.

Figure 6: Heterogenous Effects of Family Size on IPV



The findings reveal that the impact of the number of children on intimate partner violence (IPV) over a lifetime is more pronounced among women who already have children. On average, the presence of an additional child significantly increases the likelihood of domestic violence by 5.5 percentage points. This result suggests that expanding the family size when children are already present has a notable and statistically significant effect on the occurrence of domestic violence. Moreover, the findings indicate that when women have children under the age of 5, having an additional child results in a higher prevalence of intimate partner violence (IPV) over their lifetime. This increase amounts to 10.5 percentage points, which is about 5 percentage points higher than the average effect observed. These results suggest that the presence of extra children diminishes the available resources within the family, leading to heightened tension and stress, ultimately contributing to domestic violence. Particularly, the burden placed on the family is intensified when there are children under 5 years old, as they typically require more attention and time from the parents. As a result, the strain on the family's resources and the increased demands of caring for young children can exacerbate existing tensions and contribute to a higher prevalence of IPV.

The heterogeneity analysis based on the household wealth index did not yield any statistically significant findings, although the estimated values were in close proximity to the main results. This lack of significance may be attributed to the limited sample size, which ultimately reduces the statistical power of the analysis. However, despite this limitation, it can tentatively be inferred that the relationship between the number of children and domestic violence remains consistent across different levels of household wealth. In other words, the impact of the number of children on domestic violence does not appear to be influenced by the financial resources available to the household. This finding suggests that the resource dilution theory, which posits that increasing family size reduces the resources available to each family member, applies regardless of the economic circumstances of the household. It is important to note that the lack of statistical significance should be interpreted with caution, and further studies with larger sample sizes are recommended to strengthen the evidence base and provide a more comprehensive understanding of this relationship.

6.4.2 Characteristics of Other Adults and Extended Family in the Household

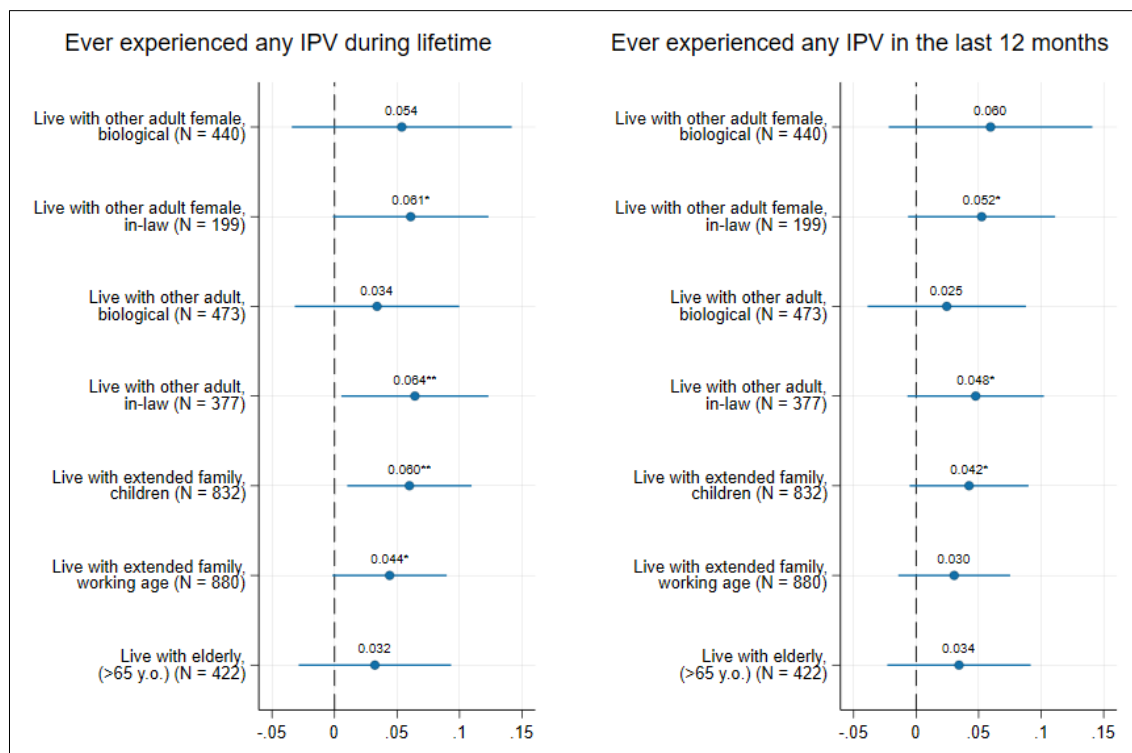
When examining the role of the extended family in relation to domestic violence, the influence of family size can have conflicting outcomes. On one hand, a larger number of individuals residing in the household, whether they are biologically related or not, can escalate the pressure on adults to fulfill their family's demands, potentially resulting in an increase in domestic violence incidents. On the other hand, the proximity of extended families living together can potentially alleviate this burden by enabling the sharing of resources among families, thereby reducing stress and instances of domestic violence.

To analyze the heterogeneity in this context, I examine whether the impact of additional children on the prevalence of domestic violence differs when women cohabit with other adult females, non-partner adults, or other extended family members (see Figure 6). Living with another adult female is defined as having a female aged 15 years and above cohabiting with the respondents, irrespective of their relationship to the household head. The findings reveal that when residing with another adult female, the presence of an extra child results in a 6.9 percentage point increase in the IPV over the course of a lifetime, and a 5.3 percentage point increase within the past 12 months. These figures are approximately 2 percentage points higher than the average impact observed. Similarly, when living with other non-partner adults, defined as adults aged 15 years and above without a spousal relationship to the respondents, a significant effect of an additional child is also observed, albeit with little deviation from the average impact. Moreover, if an individual lives with an extended family, which encompasses individuals beyond the nuclear family (i.e., excluding the household head, spouse, and children), the presence of additional children also leads to a higher prevalence of IPV, both over a lifetime and in the past 12 months. However, the results only show a slightly larger effect compared to the average impact, with the difference remaining below 1 percentage point.

The varying impact of additional children on domestic violence prevalence in different household compositions can be attributed to multiple factors. When women cohabit with other adult females, several dynamics contribute to the increased risk of IPV when more children are present. Increased caregiving responsibilities may create a greater burden, leading to higher tensions and a higher likelihood of IPV. Conflicting parenting styles or beliefs between cohabiting women can contribute to disagreements and conflicts, further increasing the risk of domestic violence. In households with cohabiting adult females, the presence of additional children may exacerbate power dynamics and

control issues. The responsibility for managing and disciplining the children might become a source of contention, leading to power struggles and potential abusive behaviors. These dynamics can contribute to the observed increase in IPV prevalence. Similarly, when women live with other non-partner adults or extended family members, the limited emotional and financial resources within the household, coupled with inadequate coping mechanisms, can further heighten the risk of domestic violence. The strain on resources, such as time, money, and emotional support, may contribute to increased stress, frustration, and conflict within the household, thereby increasing the likelihood of IPV.

Figure 7: Heterogenous Effects, by Characteristics of Other Adult and Extended Family



In order to gain a deeper understanding of the results, I conducted further analysis by disaggregating the sample based on the characteristics of other adults and extended families involved in the households. Figure 7 presents the disaggregation of the presence of other adult women and other non-partner adults based on their relationship with the women respondents, whether they are biological relatives or in-laws. However, it is crucial to recognize the constraints inherent in the survey design, as it solely captures data regarding the connection between each individual and the head of the household. This limitation poses a challenge in accurately identifying the relationship between the female respondents and other adults in the household. To maintain the integrity of the variables, I narrowed down the observations to instances where the female respondent was either the spouse or child of the household head, resulting in a smaller sample size. The results indicate that the significant effect observed among women living with other adult females, as shown in Figure 6, is primarily driven by those females who cohabit with female in-laws. Similarly, for the findings related to other non-partner adults, the significant effect is primarily influenced by the presence of non-partner adults who are in-laws. Additionally, Figure 7 presents the results

pertaining to the extended family, which were further categorized by age groups: children, working-age individuals, and the elderly. The findings indicate that the significant effect observed in Figure 6 stems predominantly from females who live with extended family members who are children (under the age of 15).

The findings align with the previously mentioned potential explanation, which suggests that conflicting parenting styles or beliefs among cohabiting women can lead to disagreements and conflicts, thereby increasing the risk of domestic violence. Notably, power struggles are more likely to arise when women cohabit with female in-laws. Furthermore, in households where there are already children, whether they are biological or extended family members, the arrival of an additional child amplifies the strain placed on the family. This is due to the increased attention and time that children typically demand from their parents. Consequently, this heightened burden on the family can contribute to an elevated risk of domestic violence. This analysis offers valuable insights into the specific relationships and dynamics within households of varying compositions, shedding light on the factors that drive the observed effects of additional children on the prevalence of domestic violence. By examining the characteristics of other adults and extended family members, we gain a better understanding of the nuanced factors that contribute to the varying impact of additional children in different contexts. Such knowledge can inform the development of targeted interventions and support systems that address the specific challenges faced by different types of households, ultimately promoting healthier and safer family environments.

7. CONCLUSION

This paper seeks to uncover the relationship between family size and the prevalence of domestic violence. According to theoretical predictions derived from the resource dilution theory, having children is associated with reduced resources leading to a higher likelihood of domestic violence due to stress, frustration, and a lower likelihood of resolution. The OLS estimation results reveal a positive correlation between the number of children and the prevalence of domestic violence against women. However, the OLS estimates are potentially biased due to the endogeneity of family size. Therefore, instrumental variable (IV) strategies are used to identify a direct causal link between family size and an increased prevalence of intimate partner violence. The IV estimates suggest that there is, on average, a 5-percentage point increase in domestic violence, equivalent to a 13% increase from the mean value, directly attributable to family size. The IV estimate is larger than the OLS estimate, indicating an underestimation of the true effect of family size on domestic violence.

Further analysis indicates that the significant effect on intimate partner violence is primarily driven by physical or sexual forms of abuse, which are often associated with serious injuries to the victim. Additionally, the IV estimates indicate that larger families tend to have attitudes that condone violent behavior. The normalization of violent behavior in larger families may be linked to a lack of resources available to effectively address and resolve conflicts, ultimately contributing to an increased likelihood of violent incidents occurring. Having more children in a family is linked to a decrease in the likelihood of women being in the labor force by 4 percentage points, a 15% reduction from the average value. This can lead to harmful effects such as limited financial independence, leaving them vulnerable to abusive relationships, which requires further research. It is also observed that the presence of other household members is a significant factor in determining the impact of family size on domestic violence. Consistent with the resource dilution theory, this suggests that when more

people live in the same household, there is a higher likelihood of resource contestation, leading to increased stress and, subsequently, domestic violence.

Drawing on the results of this study, it is imperative to adopt a comprehensive approach to domestic violence prevention, which involves a combination of family planning, economic empowerment, and addressing social norms. One crucial aspect of this approach is promoting access to and adoption of contraception, which can help individuals plan their families and avoid unintended pregnancies. This, in turn, can reduce the stress and financial burden associated with larger families and lower the risk of domestic violence. Another important intervention is facilitating women's participation in the workforce through measures such as affordable childcare and flexible work arrangements. By increasing women's financial independence, these initiatives can potentially reduce their vulnerability to domestic violence and enhance their overall wellbeing. Furthermore, it is essential to recognize the role of social norms in perpetuating domestic violence. Addressing these norms can be challenging, but changing attitudes and behaviors that contribute to this issue is crucial. This may involve promoting gender equality and challenging stereotypes about gender roles, as well as promoting healthy communication and conflict-resolution skills.

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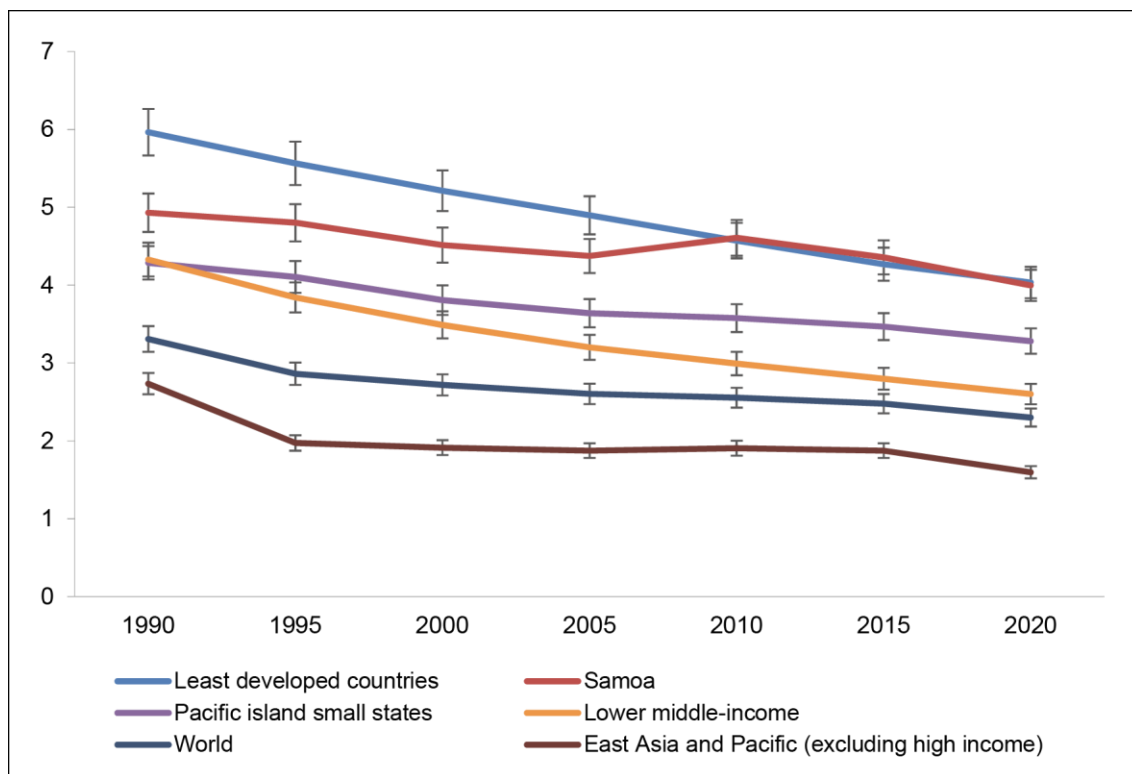
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APPENDIX

Table A.1: Types of Domestic Violence

Outcome	Description	Unit
Emotional violence	<p>Woman aged 15–49 is categorized to have ever experienced emotional violence from their spouse if she responded “Yes” to any of the following questions:</p> <p>Did your (last) (husband/partner) ever...</p> <ul style="list-style-type: none"> a. Say or do something to humiliate you in front of others? b. Threaten to hurt or harm you or someone you care about? c. Insult you or make you feel bad about yourself? 	Dummy [Yes=1; 0=otherwise]
Physical violence	<p>Woman aged 15–49 is categorized to have ever experienced physical violence from their spouse if she responded “Yes” to any of the following questions:</p> <p>Did your (last) (husband/partner) ever...</p> <ul style="list-style-type: none"> a. Push you, shake you, or throw something at you? b. Slap you? c. Twist your arm or pull your hair? d. Punch you with his fist or with something that could hurt you? e. Kick you, drag you, or beat you up? f. Try to choke you or burn you on purpose? g. Threaten or attack you with a knife, something sharp or other weapons? 	Dummy [Yes=1; 0=otherwise]
Sexual violence	<p>Woman aged 15–49 is categorized to have ever experienced sexual violence from their spouse if she responded “Yes” to any of the following questions:</p> <p>Did your (last) (husband/partner) ever...</p> <ul style="list-style-type: none"> a. Physically force you to have sexual intercourse with him when you did not want to? b. Physically force you to perform any other sexual acts you did not want to? c. Force you with threats or in any other way to perform sexual acts you did not want to? 	Dummy [Yes=1; 0=otherwise]
Any form of domestic violence	<p>Woman aged 15–49 years who have experienced any specified acts of physical, sexual, or emotional violence committed by their current husband/partner.</p>	Dummy [Yes=1; 0=otherwise]

Figure A.1: Total Fertility Rate, Births per Woman

Note: Pacific island small states include Fiji, Kiribati, the Marshall Islands, Federated States of Micronesia, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.

Source: United Nations Population Division, 2022. Retrieved from <https://population.un.org/wpp/>.