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## The Impact of Women's Labour Force Participation on Domestic Violence in Jordan

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# **Courant Research Centre**

## **‘Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis’**

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**No. 143**

**The Impact of Women's Labour Force Participation on  
Domestic Violence in Jordan**

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# **The Impact of Women's Labour Force Participation on Domestic Violence in Jordan**

Juni 2013  
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## **Abstract**

Enhancing women's participation in the labour force has been seen as a way to promote their empowerment which in turn is believed to enhance their well-being and well-being of their children. However, the empirical literature on the relationship between women's employment status and domestic violence is less clear-cut. Motivated by this ambiguity, this study explores the effect of women's employment measured by their participation in paid work outside the home on reported spousal violence, based on quantitative data from Jordan in 2007. A notable feature of this paper is that it controls for the potential endogeneity of women's employment which might bias the relationship between employment and spousal violence. Disregarding the issue of endogeneity, the first regression results suggest that woman's participation in paid work enhances violence by her husband. After controlling for endogeneity of female employment using instrumental variable estimation, however, these results turn out to be insignificant, which suggests that women's work status has no causal influence on marital violence.

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## ***1. Introduction***

In countries of the Middle-East women constitute about 28% of the working population, whereas in comparable middle-income countries the proportion is about 43%. The female labour force participation rate in Jordan stands at only 14.9% in 2005 and lies far below the rates in the region and other low-middle income countries (Economic and Social Council, 2007; World Bank 2004, Gaddis and Klasen, forthcoming).

Promoting female employment may be desirable on intrinsic or instrumental grounds. Following Sen's capability approach, the chance to work constitutes an important element of women's well-being. It is also seen as an important driver of her empowerment, again an important aspect of female well-being (Sen, 1998).

Furthermore, the empowerment of women in developing countries may have various desirable instrumental effects. A number of studies have provided empirical support of these effects which indicate, that women who have better access to economic resources invest more in education and nutrition of their children, have an increased awareness of health prevention and lower fertility rates (e.g. Vyas and Watts, 2009). In fact, female employment has been found to be a robust factor reducing fertility, child mortality, and gender bias in mortality (e.g. Murthi et al. 1995; Klasen and Wink, 2003). Reducing gender gaps in employment has also been seen as a robust determinant of economic growth using cross-national and cross-regional studies (Esteva-Volart, 2005; Klasen and Lamanna, 2009).

At the same time, there may also be negative impacts of female employment on female well-being. In particular, the question arises whether female employment might lead to more domestic violence. Domestic violence affecting women is recognized as a violation of the basic rights of women and freedom from such violence is an important aspect of women's welfare (WHO, 2002). It also has severe health (physical and psychological) and social consequences for women. Empirical studies show the large economic and social costs of domestic violence (Heise et al., 1994). Accordingly, domestic violence is associated with higher maternal mortality, lower child survival, higher incidence of Aids and lower socio- economic development (Heise et al., 1998). As a result of these worrying facts, the UN Committee on the Status of Women chose the issue of violence against women and girls as the priority theme of the 2013 session (UN, 2013).

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As discussed below, the link between domestic violence and a woman's involvement in paid work in the existing empirical literature is unclear. One strand of studies find a "protective" effect as the earned income of the women promotes her empowerment which in turn leads to a better bargaining position within the household, leading to reduced spousal violence.<sup>1</sup> In contrast, a second part of literature indicates that female employment increases spousal violence, since the husband sees his role as family's breadwinner as undermined. Motivated by this ambiguity, this paper examines the link between the economical empowerment of Jordanian women, measured by women's involvement in paid work outside the home and spousal violence.

A key concern is the potential endogeneity of women's working status and the incidence of violence, due to reverse causality and/or omitted variable bias. For instance, it may be the case that domestic violence is leading women to seek outside employment, or that unobserved factors drive the women's decision in favour of work and the husband's disposition to violence. To address these issues, several probit regressions using instrumental variables are implemented. While our regular probit results indeed show that employment outside of the home increases domestic violence, we find an insignificant effect of employment on domestic violence in the IV specification, suggesting that endogeneity bias is indeed a problem and leads to spurious positive relationship between employment and domestic violence.

The paper proceeds as follows. In Section 2, the existing theories of domestic violence and empirical findings are summarized. Section 3 presents the dataset and variables of the analysis and Section 4 outline the empirical specification. Section 5 discusses the econometric estimation results and section 6 concludes.

## ***2. Theoretical Background***

### ***2.1 Theories of domestic violence***

#### ***Bargaining Models***

Non-cooperative bargaining models of domestic violence, such as Farmer and Tiefenthaler (1997), predict that an increase in women's economic empowerment through earned

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<sup>1</sup> Incidentally, this is also the implicit position taking by the summary document of the Committee on the Status of Women which sees female economic empowerment as a critical means to reduce domestic violence (UN, 2013).

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income or financial support from outside the marriage will decrease the level of violence within households. Women's financial independence will increase their probability of leaving the abusive relationship by providing better outside options. This may lead to either the end of the abusive partnership or a decrease in violence in an intact family. In a similar setting, Tauchen Witte and Long (1991) developed a Nash-bargaining model of domestic violence in order to represent the effect of changes in income on the incidence of domestic violence. In their model, every spouse has a specific level of the threat-point which should provide the minimum level of welfare of each spouse within the relationship. The threat-point of the women determines the level of violence she is willing to accept given a specific amount of financial transfers from her husband without leaving the marriage. The model predicts that an increase in the man's income enables him to "buy" more violence by increasing the financial transfers to his wife. On the other hand, an increase in woman's income constrains him to reduce violent behaviour towards his wife. Similarly, in the resource-theory, the additional income of the women leads to a higher household income. This resource effect causes a decrease of the economic stress in the household which would thereby serve to reduce spousal violence indirectly (Gelles, 1997). All of these models thus predict a protective effect of female employment for the women concerned, leading to a reduced incidence of domestic violence.

### ***Male Backlash Models***

In contrast to household-bargaining models, "male backlash" models developed by sociologists predict the opposite. As women's wages increase, violence against them increases as well, since men feel their traditional gender role as threatened. According to Macmillan and Gartner (1999), marital relationships are dominated by socially and culturally prescribed gender roles. To the extent that women's independence changes socially sanctioned gender roles, women can experience more violence since the male might try to compensate his lack of authority by inflicting violence on her.

A second theory by Molm (1989) represents violence as one of the two sides of a reward/punishment approach. In this approach, individuals possess two sources of power. They can transfer resources (rewards) or use violence as punishment. If the husband's income decreases relative to his wife, his ability to influence his wife's behaviour by transferring resources decreases. In this case, he is more likely to rely on violence as

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punishment. Therefore, an increase in women's income relative to men's may end up increasing violence.

Theories of male backlash and exchange theory do not take into account women's rationality constraint in abusive relationships (Aizer, 2005). They ignore the possibility that women can choose to end the relationship. In certain countries, to which Jordan belongs, however, women do not have attractive outside options. The divorce rate in Jordan is quite low, around 1.96%. The traditional legal system based on the Sharia impedes women's possibility to divorce as separation is accompanied by significant social stigma and economic distress. In this context, the threat of ending the marriage may not be credible and using a bargaining model may not be appropriate (Battarcharya et al. 2003). The most common divorce procedure is the talaq ("arbitrary" divorce) which is exclusively a right of the husband to divorce his wife without providing any legal reasons. The law recognizes the wife's right to financial compensation after an arbitrary divorce and she gets compensated for no less than one year and no more than three years. If the wife is seeking a divorce in Jordan, she gives up all her financial marital rights and may face an insecure economic situation after divorce (El Azhary, 2003).

## ***2.2 Previous empirical findings***

Consistent with the theoretical ambiguity, the existing empirical evidence on the effect of women's economical empowerment is not clear-cut. Macmillan and Gartner (1999) analyse the relationship between women's employment and spousal violence against them among Canadian women. The empirical results indicate that the effect of women's employment on marital violence depends on men's working status. If the husband is unemployed, the risk of violence decreases if the woman works, whereas it increases for working women when the husband is employed. Furthermore, they find that in large households and in rural areas domestic violence is more likely to appear. Battarcharya et al (2009) explores the link between women's work status, women's ownership and domestic violence in India. Taking into account the potential endogeneity of this relationship, they instrument women's employment status by the membership in a specific caste. The estimation results show that women's participation in paid work is associated with a sharp reduction in spousal violence. Using 125 Californian women who were victims of domestic violence, Tauchen,

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Witte and Long (1991) found that in low and middle income families, an increase in women's wage reduces violence, whereas an increase in men's income increases violence. In high-income families, where most of the income is earned by women, an increase in her income leads to an increase in violence.

Among studies which support the male backlash theory are those of Atkinson and Greenstein (2005). They analyse the incidence of violence under consideration of cultural variables and traditional gender roles. Using an index of traditionalism, the effect of the relative income on the incidence of violence is tested. The estimation results indicate that the share of women's income is only positively correlated with spousal violence if the husband has a traditional ideology. Bloch and Rao (2002) found that the risk of spousal violence is higher for a woman from a rich household, using a survey data in three villages in Karnataka in India. The regression results suggest that a more dissatisfied man whose cost of violence are low enough inflicts violence on his wife in order to extract more money from her family.

Not many studies are available from Middle-Eastern countries, among them John Kishor (2004) who find a positive relationship between women's engagement in paid work and the incidence of violence. But none of these studies control explicitly for the endogeneity of women's employment status which may bias the results; it could be the women's employment is a response to domestic violence or employment and domestic violence are jointly determined by an unmeasured third factor (such as underlying attitudes and values); this is an issue we deal with explicitly below. Thus theory and evidence is inconclusive at this stage, necessitating further empirical investigations that particularly also address the endogeneity issue just discussed.

### ***3. Data***

The analysis in this paper is based on the household- and women-only questionnaire of the Jordan Population and Family Health Survey (JPFHS) of 2007. The data were collected by Measure DHS initiated by the US Agency for International Development in order to provide data for demography, health and nourishment for children and women in developing countries. For a nationally representative sample, 14,564 households in Jordan were interviewed, among them 10,867 ever-married women in the age of 15-49 years. The



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non-response rate in this survey is less than one percent. All twelve governorates of Jordan are included as well as urban and rural areas and the Badia desert region in the south.

The women questionnaire includes a special section regarding domestic violence and women's empowerment in order to examine the extent and the acceptance of domestic violence within society. In order to identify if the woman experienced **emotional violence**, the following questions were asked: Does/did your husband ever: say something to humiliate you in front of others/ threaten to hurt or harm you or someone close to you?

To reveal the extent of **physical violence**, they asked: Does/did your husband ever: push you, shake you, or throw something at you/ slap you or twist your arm/punch you with his fist or with something that could hurt you/ kick you, drag you or beat you up/ try to choke you or burn you on purpose/threaten you with a knife, gun, or any other weapon/ attack you with a knife, gun, or any other weapon?

To identify if the women experienced any **sexual violence**, they asked: Does/did your husband ever physically force you to have sexual intercourse with him even when you did not want to?

These three different kinds of violence, emotional, physical and sexual, were summarized to an index of spousal violence which represents the dependent variable in the regression analysis of the following sections. If any of the three questions are answered with a yes, the variable is one. Since the dependent variable, spousal violence, is a binary variable which can only take the values zero or one, the standard OLS estimation cannot be used. Under the assumption that the error term is standard normally distributed, the estimation of the coefficients is performed by a probit model.

#### ***4. Empirical Specification***

The probit model concerning domestic violence includes socio- economic characteristics of both husband and wife, household- data and regional components. Thus, the presence of domestic violence may be represented as,

$$DV = a_0 + \beta_i \text{Characteristics Husband/Wife} + \beta_j \text{HH-Characteristics} + \beta_k \text{Region} + \varepsilon_i \quad (1)$$

The dependent variable domestic violence captures the incidence of both emotional and physical violence in the household. The key independent variable, working status of the

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woman, captures if the woman is involved in paid work outside the home. Other control variables included in the specification indicate the number of co-wives, the number of children and the degree of kinship between man and woman. Since there are vast differences in the economic and social structure of the different governorates of Jordan, they are captured by regional dummy variables.  $\varepsilon$  represents other unobservable factors that are captured by an i.i.d. error term.

### **Endogeneity Issues**

A key concern in this regression is the potential endogeneity between woman's working status and violence of her husband. Endogeneity can have several sources, two of which may be present in this model, namely simultaneous causality and omitted variables. In the first case, the presence of violence may lead a woman to increase or decrease her willingness to work, a subject that is particularly examined in the developed country literature. Most of these studies suggest that violence reduces employment of female victims as severe mental and health consequences may inhibit women to work (Staggs and Riger, 2005; Tolman and Wang, 2005). In this case, causality would run both ways, leading to a biased coefficient on female employment. In the second case of omitted variables, unobserved factors such as a traditional ideology of the husband which may motivate violence may also influence a woman's decision to work. In other words, women's working status and violence of the husband are driven by a third unobserved factor, the degree of traditionalism of the husband. These two possibilities of endogeneity suggest that in equation (1) the observed relationship between women's working status and domestic violence may be biased or even spurious. Under the assumption that the incidence of violence is positively correlated with the degree of traditionalism of the husband  $\beta > 0$  and  $\text{Cov}(\text{employment}, \text{traditionalism}) < 0$ , (assuming that a more traditionally socialized spouse does not allow his woman to work), we may have a downward bias, finding a spurious negative correlation. Of course, if traditional husbands beat their wives less (and ensure that they work less), there could be a spurious positive correlation, leading to an

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overestimate of the coefficient on the employment status.<sup>2</sup> In this case, the coefficient of women's employment status is underestimated. With respect to reverse causality, the impact is hard to identify. If violence causes women to work less, it may lead to a downward bias of the coefficient (i.e. an underestimation); if it causes women to work more, it would lead to an upward bias. Existing literature suggests that estimates of the effect of women's employment are more likely to be underestimated (Farmer and Tiefenthaler, 2004; Johnson, 2008).

To tackle the issue of endogeneity through omitted variables a "Two Stage Least Squares" estimation is implemented. Specifically, the first stage is defined by

$$\text{Working status} = \Pi_0 + \Pi_1 z_1 + \Pi_2 z_2 + v_i \quad (2)$$

where working status is predicted by the exogenous instruments  $z_1$  and the control variables  $z_2$  (which overlap with the variables in (1)). In the second stage the prediction of working status will be included in equation (1) instead of the endogenous variable women's employment as the predicted value is not correlated with the error term  $\varepsilon$ . A key issue in this estimation is the validity of the instruments. A valid instrument should fulfil two conditions: First, it should be strongly correlated with the endogenous variable. Second, it should be exogenous in the basic model. In the current case, there are a few potentially strong candidates which could serve as good instruments, for instance type and size of the family or currently pregnant. These variables are already used in other studies to instrument women's work status (Bhattacharya et al. 2009; Chin, 2007). But the results of appropriate tests indicate that for this case only the variable *children under three years* constitute a valid instrument. The presence of young children is strongly correlated with work status but should have no direct bearing on violence. Hence, the conditions of a valid instrument should be fulfilled. In the empirical analysis several specifications with potential instruments are estimated and validity and strength of the instruments are tested.

To estimate this equation we use IV-estimation techniques. As there are questions regarding the consistency of these IV estimation techniques when in both stages there is a

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<sup>2</sup> For example, one may argue that in these traditional families, gender roles are clearly delineated with each 'knowing their place', leading to less conflict and violence. (Of course, this absence of violence would not

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limited dependent variable, we also estimate the equation using a linear probability model for both stages as a robustness check.

## ***5. Empirical Analysis***

### ***5.1 Descriptive Statistics***

According to the Jordan Population and Family Health Survey 2007, one in five ever-married Jordanian women reported that they ever experienced physical violence by their husband. For 12 percent of women, this violence had occurred within the year before the survey. Eight percent of ever-married women report sexual violence by their husband. One in five women also reported to have experienced emotional violence by their husband. Overall, 32 percent of ever-married women reported ever having experienced emotional, physical or sexual violence by their husbands. These are large shares of women, particularly if one allows for the possibility of underestimation of domestic violence in such a survey setting.

Women with lower levels of education and those living in poorer households are more likely to report spousal violence than those with more education or those living in wealthier households. Table 1 shows that reports of physical/sexual/emotional violence also vary by regions. Only 10 percent of women in the South report ever experiencing physical or sexual violence by their husband, compared to 38 percent of women in the Central regions. Spousal violence is also more common in situations when the husband is better educated than the wife and in households where women are less able to make decisions. These correlations are interesting, but do not necessarily imply a direction of causality.

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mean that there is no inequality. The absence of violence could merely be a result of both partners accepting

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**Table 1: Incidence of domestic violence by region in percent**

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	Incidence of violence			
	Emotional	Physical	Sexual	No violence
<b>CentralRegion</b>	6.7	31.2	1.7	60.4
<b>North</b>	5.1	19.1	3.2	72.6
<b>South</b>	5.8	17.8	3.4	73.1
<b>Jordan</b>	5.9	23.1	2.7	68.3

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Data Source: DHS, own calculations

## 5.2 Independent variables

**Women's employment status** is measured as a binary variable, if the woman is engaged in paid work outside the home. If the variable takes the value zero, the women is unemployed or works inside her home. The variable for **husband's employment** reports for value one if he did not work during the last 12 months. Since **education** might have a non-linear affect on violence, the squared term is included in the model as well. Since age of men and women shows a high correlation, the variable **age difference** between the two spouses is included in the model, also to indicate differences in bargaining power. Regarding household-characteristics, **wealth** using an asset index indicates the economic position of the household. The index is divided in five quintiles for the categories, poorest, poorer, middle, richer and richest. Since no further variables concerning the economic status of the household are available in the dataset, wealth is the single indicator. **Household-size** reports the number of living persons in the household. Location effects are measured by the variable **urban**, and the capital city **Amman**. The latter is included in the regression in order to control for unobserved heterogeneity between urban and rural areas and the specific situation of Amman, Jordan's capital and by far largest city. Similarly, the **Badia – region** is included separately as it involves different forms of cultural life and traditions as in the rest of Jordan. Descriptive statistics on these variables are shown in Appendix Table 1.

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the very unequal situation in the family).

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### 5.3 Instruments

#### *a. Number of children under the age of 3*

Table 2 shows the presence of young children by age groups of women, showing that young children are present in all age groups of reproductive age; nevertheless, a non-negligible number of women with young children work for pay outside the home. 4 % of women with children under the age of three years work compared to 19% of women without young children.

**Table 2: Women's work status and young children (below 3) in the household**

	No young children			Young children		
Women's age	Not working	working	Total	Not working	working	Total
16-22	85.3	14.6	100	96.5	3.5	100
23-29	42.8	57.2	100	98.8	1.2	100
30-36	70.6	29.4	100	94.4	5.6	100
37-43	87.9	12.1	100	95.3	4.7	100
44 >	83.3	16.7	100	57.2	24.8	100
Total	81.1	18.9	100	95.9	4.1	100

Data source: DHS, own calculations

## 6. Estimation results

### 6.1 Baseline equation

Table 3 presents the estimation results of equation (1) measuring the probability of a woman to experience violence from her husband. Following the narrative provided in the earlier sections, the discussion focuses on the role of women's work status influencing the probability of experiencing violence. Most of the other variables have already been tested before in other studies on domestic violence (for example, Flake, 2005; Rao, 1997; Jejeebhoy, 1998; Panda et al., 2005).

Table 3 shows that women's labour force participation has a small, but significant positive effect on the probability of spousal violence. If a woman is involved in paid work, the

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marginal effects suggest that the probability of spousal violence increases by 4.25%. This result would seem to support the *Male Backlash Theory* in which the man as breadwinner sees the working wife as an affront to his status within the family (Battharchia et al., 2003). An increase in women's education has a non-linear effect on domestic violence. At low levels of education, the incidence of violence increases, while at high levels, it decreases with the turning point being about 10 years of education.<sup>3</sup> Interestingly, the relationship between husband's education and domestic violence is convex, but the effect is rather small and only the square is significant. Age difference is positively linked to violence, but the effect is not statistically significant. Household-size also displays a positive effect on violence. This would be consistent with the idea that more persons in the household cause more social stress, but again this coefficient is not significant at conventional levels. Consistent with expectations, wealth, reflecting the economic status of the household, reduces violence, as poor households are more prone to violence since the lack of financial resources might cause economical stress. The presence of children under the age of three years is not associated with violence, suggesting that the presence of young children has no direct impact on violence: The coefficient is very small and highly insignificant suggesting that the presence of young children might be a suitable instrument as it is empirically found to have no direct effect on spousal violence.<sup>4</sup> Both indicators for urban regions, *Amman* and *Urban*, have a positive sign, going against the empirical literature which suggests a negative link between urban areas and domestic violence. This result may be driven by the fact that flight from the countryside leads to a higher population share of traditional and rural families in urban areas. It could also point to tensions and clashes of values and attitudes associated with urban living, often in cramped living quarters.

The coefficient of *number of cowives* has a positive sign suggesting that women experience more violence if they live in polygynous marriages. This is consistent with some other theoretical and empirical models. For example Hassouneh-Phillips (2001) finds that women of polygynous marriages experience higher levels of emotional, physical and sexual abuse relative to women of monogamous marriages. Violent behaviour is often used by a

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<sup>3</sup> Only the squared term is statistically significant on its own; but an F-test of the joint significance of both the linear and the squared term suggest that they both are jointly significant.

<sup>4</sup> Note also that removing this variable has virtually no impact on the other covariates.

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husband as a source of controlling wives within the marriage. The addition of wives causes significant stress as it constitutes a change in family and economic structure (Hassouneh-Phillips, 2001; Al-Krenawi, 1999). The first wife is forced to share existing resources with the new families of the husband and competition is most fierce around a husband's investment in health, education and attainment of their children (Bledsoe, 1993; Al-Krenawi, 1999). Further empirical support is given by a cross-sectional study in South Africa, finding that polygyny is associated with higher rates of domestic physical and sexual abuse (Jewkes and Penn-Kekana, 2002).

Consanguinity marriages could be a relevant factor as they are relatively common in Jordan with 43% of marriages taking place between relatives (mostly first or second cousins, DHS Report, 2009). The coefficient of cousin marriages, however, appears to have a negative but insignificant impact on violence. According to the Gendered Resource Theory of Atkinson and Greenstein (2003), a more traditional ideology is accompanied with a higher probability of violence. The negative relation of violence and traditionalism in this model might, however, reflect higher family control and sanctions facing the husband in case of violence towards his wife (Counts et al., 2001; Erchak, 1984). Empirical evidence is given by Stieglitz et al. (2011) who found a negative impact of kinship marriage on marital violence due to the principle of deterrence and control of the family.

The overall-fit of the model has a likelihood-ratio of 46.31 and a p-value of 0.00, both indicating, that the model is significant as whole, compared to a model which includes only the constant. The pseudo-R<sup>2</sup> of 0.24 is surprisingly high for a cross-sectional model with a limited dependent variable, suggesting that we are able to account for the key drivers of reported domestic violence reasonably well. Finally, the Durbin– Wu– Hausman Test (Table 4) confirms the endogenous relationship between woman's work status and spousal violence. With a p-value of 0.00 the null hypothesis of exogeneity can be rejected at conventional significance levels.

## ***6.2 Instrumental Variable Estimation***

As discussed in the previous parts, the variable women's work status is instrumented with the variable young children. Young children affect the decision of women to work, with women with young children being less likely to participate in labour force. But we argue that the presence of children under three has no direct influence on domestic violence (as



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was found to be the case in Table 3), making it therefore a suitable instrument. Thus in the IV estimation the coefficient on the work status reflect the causal effect of working status on domestic violence.

The estimates in Table 4 show that, as expected, the presence of young children decreases the probability that the woman works. This effect is statistically significant at a one percent significance level. If a woman has young children, the probability that she is engaged in paid work decreases by 2.5 percentage points. In the second stage of the IV estimation also shown in Table 4, the coefficient of work status now turns out to have a negative effect on violence. However, this result is not significant at conventional significance levels. The variable work status appears to have no bearing on violence, as opposed to the basic model. This result suggests that the positive relationship between violence and woman's employment in the basic model is likely to be driven by omitted variables, rather than male backlash.

To support these estimation results, formal tests are implemented to analyze the validity and strength of the instrument. To examine the validity of the instruments the Wald-Test and the Hansen-J Statistic are carried out. The Wald- Test with the null hypothesis of exogenous instruments cannot be rejected with a p-value of 0.29, indicating that the instrument is not correlated with the error term. This is supported by the Hansen-J Statistic which records a p-value of 0.59, giving evidence that the null hypothesis of orthogonality of the instruments cannot be rejected. The predictive power or relevance of the excluded instrument is tested via the Angrist- Pischke F- Statistic for joint significance of the excluded instruments. The F-Test records a value of 16.32 which indicates a strong correlation of the instrument with women's work status. According to Stock, Wright and Yogo (2002) the F- Statistic should at least be higher than 10 for the instruments to be truly valid. Moreover, the strength of the instrument is tested by the weak instrument robust test of Finlay and Magnusson. The confidence intervals of the weak instrument robust test are significant smaller than the confidence intervals of the Wald-Test, indicating that the instrument is strongly correlated with the endogenous regressor. Based on these tests and the theoretical justification young children appear to be a valid instrument.

In order to test the robustness of the results to possible estimation problems of using probit models in our IV estimation, we also estimate the IV regressions using a linear probability model (i.e. using OLS). The results, shown in Table 5, confirm our findings

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from the probit estimations. If endogeneity is not considered, the working status of the wife appears to increase domestic violence. In the IV model, children under three work as a valid instrument and the work status of the wife is no longer significant.

## ***7. Concluding remarks***

On the basis of a representative national household survey from Jordan, this paper explored the link between the effect of women's regular employment in paid work and spousal violence. Once we control for endogeneity, there no longer is a significant impact of wife's employment status on domestic violence. As a result, we can neither find evidence for a protective role of female employment nor for a male backlash. Also the hypothesis of Vyas and Watts (2003) stating that women entering the labour market in regions where it is not common for women to work outside their home are more prone to violence due to their "pioneer role", cannot be confirmed.

Even if the relation between employment and violence does not show a "protective" effect, it implicates however that women are "free" to work and should not fear any constraints when being involved in paid work. But the results have further consequences suggesting that policies addressing job opportunities in the labour market for women in order to reduce violence as advocated recently (UN, 2013) may not be successful in their aim, at least not in the short-run.

Methodologically, this study showed that it is important to control for unobserved factors. Estimates which do not account for the possibility of omitted variables are more likely to draw the conclusion that women's work status is indeed associated with an increased incidence of violence. However, it has to be kept in mind that data concerning sensitive issues like domestic violence are suffering from underreporting and may cause measurement errors. Thus, the results of these estimations are surely not the last word on the subject.

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## Appendix

**Appendix Table 1: Descriptive Statistics**

Variables	Mean	Std. Dev.
Spousal violence	0.29	0.45
Husband's education (in years)	10.44	0.35
Husband's age	39.88	9.63
Husband employed	0.16	0.35
Wife's education (in years)	10.46	5.36
Wife's age	34.11	7.73
Wife engaged in paid work outside home	0.15	0.48
Household-size	6.57	2.53
Number of children under three years	3.92	2.54
Wealth	2.57	1.31
Urban/rural	1.31	0.46
Badia-region	0.14	0.34
Amman	0.12	0.32
Number of co-wives	0.061	0.23
Kinship marriage	0.422	0.48
Age difference	5.98	5.91

Data Source: DHS, own calculations

**Table 3: Probability of Experiencing Violence- Probit Estimates**  
**Dependent Variable: Husband violence**

Variables	Probit (Coefficients)	Probit (Marginal Effects)
Wife`s Working Status	0.203* (0.121)	0.0713* (0.0443)
Husband`s Education	-0.00942 (0.00982)	-0.00315 (0.00329)
Husband`s Education <sup>2</sup>	8.13e-05 (0.000133)	2.72e-05 (4.44e-05)
Husband employed	-0.0989 (0.0722)	-0.00335 (0.0249)
Wife`s Education	0.0293 (0.0211)	0.00980 (0.00706)
Wife`s Education <sup>2</sup>	-0.00334*** (0.00123)	-0.00112*** (0.000410)
Age difference	0.00366 (0.00437)	0.00122 (0.00146)
Householdsize	0.0298*** (0.0103)	0.00998*** (0.00343)
Children under three years	-0.0185 (0.0544)	-0.00621 (0.0182)
Wealth	-0.0327 (0.0231)	-0.0109 (0.00774)
Urban	0.109* (0.0581)	0.0360* (0.0189)
Badia-Region	-0.0427 (0.0771)	-0.0141 (0.0253)
Amman	0.175** (0.0768)	0.0608** (0.0275)
Number of co-wives	0.320*** (0.106)	0.115*** (0.0402)
Kinship marriage	-0.0597 (0.0652)	-0.0197 (0.0213)
Constant	-0.627*** (0.147)	-
<i>Pseudo R<sup>2</sup></i>	0.2407	0.2407
<i>Observations</i>	2,996	2,996

Standard errors in parenthesis \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Probability of Experiencing Violence and Working-Instrumental Variable**

<b>VARIABLES</b>	<b>First Step Working Status</b>	<b>Second Step Husband violence</b>
Woman's Working Status	-	0.350 (0.415)
Husband employed	-0.0049 (0.00745)	-0.00206 (0.00654)
Husband's Education	0.000501 (0.00152)	-0.00949 (0.00989)
Husband's Education <sup>2</sup>	-4.48e-06 (2.05e-06)	8.20e-05 (0.000133)
Woman's Education	-0.0289*** (0.00320)	0.0336 (0.0241)
Woman's Education <sup>2</sup>	0.00246*** (0.000179)	-0.00370** (0.00163)
Age difference	-0.00155** (0.000686)	0.00389 (0.00446)
Wealth	0.0129*** (0.00349)	-0.0345 (0.0224)
Household-size	-4.49e-05 (0.00160)	0.0298*** (0.0103)
Badia-Region	0.0176 (0.0119)	-0.0453 (0.0784)
Amman	-0.0321*** (0.0119)	0.180** (0.0778)
Urban	-0.0163* (0.00888)	0.111* (0.0589)
Number of co-wives	0.00500 (0.0170)	0.319*** (0.105)
Kinship marriage	-0.00847 (0.00991)	-0.0585 (0.0656)
IV- children under three years	-0.126*** (0.00799)	-
Constant	0.116*** (0.0228)	-0.644*** (0.143)
<i>Pseudo R<sup>2</sup></i>		0.2093
<i>F-Test of excluded instruments</i>		246.53
<i>Test of overidentifying restrictions (p-value)</i>		0.238
<i>Wald test of exogeneity</i>		0.7325
<i>Observations</i>	2,996	2,996



**Table 5: Probability of Experiencing Violence- Linear Probability (OLS) Estimates**  
**Dependent Variable: Husband violence**

Variables	OLS (Coefficients)	First Stage Working Status	Second Stage Husband violence
Wife`s Working Status	0.0630* (0.0385)	-	0.106 (0.137)
Husband`s Education	-0.00296 (0.00336)	-0.00489 (0.000755)	-0.00326 (0.00557)
Husband`s Education <sup>2</sup>	2.61e-05 (4.47e-05)	0.000502 (0.00152)	-0.00298 (0.00329)
Husband employed	-0.0475 (0.0647)	-4.48e-06 (2.05e-05)	2.63e-05 (4.42e-05)
Wife`s Education	0.00798 (0.00724)	-0.028*** (0.003211)	0.00923 (0.00806)
Wife`s Education <sup>2</sup>	-0.000983** (0.000397)	0.00246*** (0.000179)	-0.00109** (0.000537)
Age difference	0.0122 (0.000481)	-0.00155** (0.000686)	0.00136 (0.00150)
Householdsize	0.0101*** (0.0103)	0.0129*** (0.00348)	-0.0116 (0.00739)
Children under three years	-0.00544 (0.0181)	-4.49e-05 (0.00160)	0.0101*** (0.00344)
Wealth	-0.0111 (0.00766)	0.0176 (0.0119)	-0.0148 (0.0259)
Urban	0.0352* (0.0188)	-0.0321*** (0.02649)	0.0598** (0.0261)
Badia-Region	-0.0141 (0.0258)	-0.0161* (0.00888)	0.0359* (0.0192)
Amman	0.0584** (0.0266)	0.00505* (0.0180)	0.118*** (0.0366)
Number of co-wives	0.118*** (0.0403)	-0.00847 (0.00991)	-0.0182 (0.0241)
Kinship marriage	-0.0186 (0.0211)	-0.126*** (0.00656)	-
Constant	-0.269*** (0.0506)	0.1157*** (0.0228)	0.264*** (0.0477)
<i>Pseudo R<sup>2</sup></i>	0.025	0.2093	0.024
<i>F-Test of exc. instruments</i>			253.53
<i>Hansen-J Statistic (p-value)</i>			0.358
<i>Observations</i>	2,996		2,996

Standard errors in parenthesis  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1