

GENDER EQUALITY & DEVELOPMENT

ESTIMATING THE ASSOCIATION BETWEEN WOMEN'S EARNINGS AND PARTNER VIOLENCE: Evidence from the 2008-2009 Tanzania National Panel Survey

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ABSTRACT

Partner violence is the most common form of violence against women and the adverse consequences for women's health have been well documented. Few studies have estimated the economic costs of partner violence in low- and middle-income countries and current evidence suggests that the cost is large. The aim of this study is to explore the relationship between women's labor market outcomes and partner violence among Tanzanian women, and to estimate the difference in women's weekly earnings between women who have been abused and women who have not. In addition, this study estimates the "lost earnings" to women because of partner violence as a share of Tanzania's GDP. Using data from the nationally representative 2008-2009 Tanzania National Panel Survey, the study uses propensity score matching methods to estimate the difference in women's earnings from formal waged work and non-agricultural self-employment—data on women's earnings from agricultural self-employment (the largest employment sector for women in Tanzania) were not collected in the survey. Findings from this study reveal that partner violence is pervasive in Tanzania and that abused women earn less than women who have never been abused, with the greatest loss of earnings experienced by women in formal waged work (compared to women in non-agricultural self-employment) and by women in urban areas (compared to women in rural areas). The estimated productivity loss associated with partner violence amounted to 1.2 percent of Tanzania's GDP, an estimate likely to be far higher if earnings from agricultural self-employment had been included.

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INTRODUCTION

Violence against women is recognized as an important public health and development issue [1-2]. Violence by an intimate partner is one of the most common forms of violence against women and there exists a variety of “types” including physical violence, sexual violence, and emotional abuse. Physical violence includes acts ranging from slaps and shoves (moderate physical violence), to kicks, assaults with a weapon, and in extreme cases homicide (severe physical violence); sexual violence documents acts including unwanted sexual touching, sexual assault, forced or coerced sex, or forced participation in degrading sexual acts; and emotional abuse includes acts such as insults or threats of harm [3-4].

The adverse effects of partner violence on women’s physical, sexual, and reproductive and mental health have been well documented. A small but emerging area of research is exploring the economic burden of partner violence in low and middle income countries (LMIC), in particular on the productive labor time lost. The rationale for this exploration can be explained by human capital theory that assumes all individuals contribute to a society’s productivity [5]. The marginal productivity of each individual depends on their well-being so that higher well-being results in higher output in the economy. If partner violence affects women’s well-being because of ill-health including depression, lack of concentration, and low self-esteem, then this in turn reduces women’s productivity [6]. The extent to which partner violence interferes with women’s ability to work is often measured by multiplying the monetary value of a day’s productivity loss (the wage received) by the number of days off work [5, 7-8].

Early work conducted in the late 1990’s in Nagpur, India, that gathered information from women on the number of days of productive and household work lost after experiencing a violent episode, found that women had to forgo, on average, seven days of paid work per incident and that men missed, on average, almost ten days of paid work after they had been violent towards their partners [9]. As a result, the lost productivity from both women and men because of partner violence equated to 759.30 R (approximately US\$18) per violent incident, and this cost rose to 974.10 R (approximately US\$23) per violent incident when including the cost of missed housework that averaged a further seven days [9]. In a recent three country study, 12.5 percent of women in Uganda reported losing time from reproductive work because of partner violence and that in 10 percent of violence incidents women lost on average 11 paid work days annually. In Bangladesh, the average value of lost work per violent incident was approximately US\$5 or 4.5 percent of the average monthly household income [10]. In a study conducted in Vietnam, of the women that reported time off work due to partner violence, the average number of days lost per violent incident was 5.5 at a cost of 382,234 VND (approximately US\$18) [7].

In addition to losing days from work, partner violence can keep women from entering into employment, thus limiting the degree to which women can earn an independent income. A study among married and cohabiting women in Santiago, Chile, and in Managua, Nicaragua, however, found mixed evidence to support this assertion [6]. In Santiago a lower, but not statistically significant, proportion of women who experienced domestic violence (defined as physical and/or sexual partner violence, or psychological abuse) were working outside the home. However, in Managua a significantly higher proportion of women who experienced partner violence worked. Despite this mixed finding, in both settings, women who experienced partner violence earned significantly less than women who did not. For example, women who experienced severe physical partner violence earned 61 percent less than women who did not in Santiago and 43 percent less in Managua [6]. Extrapolating to national levels the sample proportion of working women and the calculated average income abused women and non-abused women earned, the estimated “lost earnings” to women because of domestic violence amounted to over US\$1.56 billion (more than 2 percent of 1996 GDP) in Chile and almost US\$30 million (1.6 percent of 1996 GDP) in Nicaragua [6]. Using the same method, the lost earnings because of partner violence in Vietnam amounted to 1.78 percent of Vietnam’s GDP, and a multivariate analysis that explored the association between lifetime partner violence and women’s earnings found that abused women earned 35 percent less than non-abused women [7].

The cost of intimate partner violence for the economies of developing countries might, therefore, be significant. Using data from the first wave of a nationally representative panel survey—Tanzania National Panel Survey (NPS)—the aims of this study are: to model the relationship between partner violence and productivity (measured by women’s weekly earnings); and to estimate the cost of partner violence to the macro economy.

Tanzania makes an interesting case study as it has high levels of gender inequality and the lives of Tanzanian women are going through immense social and economic changes with an increasing proportion of women seeking paid work. In addition, many forms of gender-based violence (GBV) exist including: partner violence; female genital cutting (FGC); and forced or early marriage [11-13].

Tanzania development indicators and the status of women

Tanzania is the largest country in the East African Community and is divided into 26 administrative regions (21 are in the mainland and five are in Zanzibar). The most recent estimates reveal the population to be 46.2 million with an annual population growth rate of 3 percent. The vast majority of

Tanzania's population (73 percent) live in rural areas, 50 percent are women, and 45 percent of the population are under the age of 15. Life expectancy is 57 years for men and 59 years for women [14].

Since 2000 Tanzania's GDP has grown at an annual rate of between 4.9 percent (2000) to 6.4 percent (2011). The GDP growth rate is attributed to increases from a number of subsectors, e.g. the service sector, construction, and manufacturing.¹ While the contribution to GDP from the agricultural sector, which is dominated by small-scale producers of cash crops such as coffee and cotton, has declined in recent years to 28 percent, it is still important to the Tanzanian economy accounting for over 75 percent of current employment [15]. Despite this impressive growth, Tanzania still remains one of the poorest LMIC and in 2007 approximately one-third (33.4 percent) of the population were living below the basic needs poverty line, only a slight decrease from 35.6 percent in 2000. In addition, the estimated Gross National Income per capita is estimated at US\$540 (2011) [14].

The lives of women in Tanzania are going through immense social and development changes as women seek greater economic independence and become more autonomous. The proportion of female headed households has steadily increased over the years to its current level of almost one-quarter (24.4 percent) of all households [12]. However, despite this increased status and responsibility, women are still a vulnerable and marginalized group within Tanzanian society and high gender inequality exists. Tanzania has a very low gender inequality index and ranks 119 out of the 148 countries where data exists [16].²

The majority (89 percent) of women in Tanzania are economically active and the main employment sector, though declining, is agriculture where 79 percent of economically active women were working, compared to 70 percent of men (2006 estimates) [15]. Though women slightly dominate the agricultural workforce, they still own less than one-fifth of land and women's land holding size is, on average, less than one-half of men's (0.21-0.30 hectare and 0.61-0.70 hectare respectively) [17]. Women also are more likely to produce food crops such as maize that are consumed in the home, while cash crops are primarily produced and sold by men. [18].

In addition, more than twice as many men are in formal paid work than are women (9.8 percent of all employed men and 4 percent of all employed women) and men represent more than 71 percent of the

¹ The service, construction, and manufacturing sectors have each grown by an average of 8 percent per year since 2000, and they account for 48 percent, 7 percent, and 9 percent of Tanzania's GDP respectively.

² The gender inequality index measures gender disparity and is based on the following three dimensions: 1) reproductive health indicators (maternal mortality ratio and adolescent fertility rates), 2) empowerment indicators (female parliamentary representation and educational attainment) and 3) labor force participation.

formal work force. Men in formal paid work also earn, on average, more than women even when comparing earnings by occupation and by educational attainment. Women are more likely to be represented in the informal sector, e.g. self-employed trading, where their participation has steadily increased from 35 percent in 2000 to 40 percent in 2006 [15, 19]. Estimates indicate that the number of Tanzanian women entrepreneurs is in the range of 730,000 to 1.2 million (including women who count this as secondary activities to their agricultural work) [15]. Women's productive work also tends to be in addition to full workloads at home, which include fetching water and collecting firewood, and looking after elderly and sick relatives, thus forming the largest part of the unpaid economy [15, 17-18].

Gender-based violence in Tanzania

To date, five population based studies have estimated the prevalence of partner violence including the 2009 Tanzania NPS, documented in the results section, and the 2010 Tanzania Demographic and Health Survey (DHS) that provide national estimates. All studies suggest that partner violence is pervasive in Tanzania. The 2010 Tanzania DHS found that among ever married 15-49 year old women 43.6 percent had ever experienced physical and/or sexual partner violence, and this figure was 36.8 percent in the past 12 months [12]. Three studies, conducted between late 2001 and early 2003, have estimated the prevalence of partner violence in four settings: among ever partnered women, 41 percent in Dar es Salaam and 56 percent in Mbeya had experienced physical and/or sexual partner violence since the age of 15; 26 percent of currently partnered women in urban Moshi had ever experienced physical and/or sexual violence or physical threats by their current partner and this figure was 21.2 percent for past 12 month violence; and 26 percent of women reported they had been beaten by a partner, 12 percent in the past 12 month, in Meatu district [2, 20-22].

The seriousness of violence against women and girls in Tanzania has also been documented qualitatively and highlights the extent to which it has its roots in patriarchal traditions and values. For example, the studies found that men condone the beating of wives and in some cases, believe that women expect it [11, 23-25]. Violence is used by men, often within the context of men's controlling behavior, as a means to punish women's "errant or deviant" behavior; to "educate" women if they have done wrong; or to "keep women in order" [11, 24]. This qualitative research also points to other underlying causes of partner violence including: poverty; men's unemployment; women's economic dependency on men that can lead to disputes over money; marriage practices such as polygamy and bride price; and men's drunkenness [11, 24].

A feature of Tanzanian society appears to be the normality and acceptance of domestic violence against women for infractions that are considered legitimate. Figures from the 2010 Tanzania DHS

revealed that 53.5 percent of women believed that wife-beating was justified if the woman: burnt food/failed to perform household duties; argued with her partner/was disobedient; neglected the children; went out without telling her partner; was unfaithful; or refused to have sex with her partner [12]. Sex within marriage is not recognized as rape because marriage itself implies that women have already agreed and understood the expectation that wives provide sex to their husbands [11].

Other forms of GBV are pervasive in Tanzania. Fifteen percent of women have undergone FGC and 15 percent of women reported that their first sexual experience was forced [2, 12]. In a clinic-based study among women using voluntary counseling and testing services in Dar es Salaam, 8.5 percent of women reported that they had been forced to have sex or to do something sexual by someone much older at least once before the age of 12 [26].

Violence against women persists despite the legal protections that are in place: violence against a spouse is illegal pursuant to the 1971 Law of Marriage Act. In 1998 the Sexual Offenses Special Provisions Act (SOSPA) was passed, classifying rape, sexual assault and harassment, FGC, and sex trafficking as criminal offences [27]. Women in cohabiting relationships are not protected under the Law of Marriage act however, and marital rape is excluded from the SOSPA except where the couple is separated.

In addition, many women still keep silent about their experiences of partner violence. Culture and traditional pressures condition women to accept violence by preventing them from speaking out and discussing their marital lives openly. Often women are afraid of the repercussions of disclosing violence e.g. on their children and whether they would be able to keep and provide for them, and also because they have few places to go to as they are economically dependent on their partner [28]. Moreover, women are often unaware that the violence perpetrated against them is a crime, have few places to report crime and if they do have somewhere to report a crime are too ashamed to report [11, 28].

Despite the current limited support options for abused women, the government of Tanzania has identified improving the status of women, including the ending of GBV, as a national priority. Institutional reforms have been introduced where each ministry has a gender focal point. In addition, there are signs of an increased level of activity supporting GBV prevention and response efforts including GBV screening and referrals within the health service, the piloting of one-stop service centres for GBV survivors and the creation of gender desks to respond to cases of GBV in a police station [11].

METHODS

Tanzania NPS 2008-2009

Between October 2008 and September 2009 the United Republic of Tanzania National Bureau of Statistics conducted the first wave of the Tanzania NPS—a study conducted as part of the Living Standards Measurement Study. The Tanzania NPS is a nationally representative household survey that collects information on poverty, agriculture, and other key development indicators [29].

The aims of the Tanzania NPS study are: to monitor the progress towards MKUKUTA (National Strategy for Growth and Poverty Reduction in Tanzania) goals; to understand the determinants of poverty reduction; and to provide the information necessary to evaluate the impact of development policies and programs [29].

The Tanzania NPS employs a multi-stage cluster sample design. All 26 regions in Tanzania were broadly classified into its administrative zone and each zone was stratified into urban and rural. Within each stratum, clusters were sampled at random with the probability of selection proportional to their population size. In urban areas, clusters were defined by the census enumeration area, and in rural areas the cluster is the “village.” In the first wave of the survey 3265 households were randomly selected.

Tanzania NPS questionnaires

The Tanzania NPS administers three core surveys: a household survey—the main survey instrument; an agricultural survey administered to all households that engaged in agricultural activities; and a community survey administered to village leaders [30]. This study uses information gathered from the household surveys that collected data on a broad range of topics including: education; health; labor; violence against women; food and non-food consumption; household asset ownership; and housing water and sanitation characteristics.

General household information was gathered from the household head or other “knowledgeable” adult [29-30]. Where possible and depending on the survey module, each household member over five or 12 years of age was interviewed directly on the following sections: education; health; labor; and food eaten outside of the household. All women aged 15-50 within a household were asked to answer the survey module on violence against women.

Labor supply module

The household's main respondent was initially asked about each household member's main occupation in the past 12 months. The survey then collected detailed information on labor supply from all household members aged above 12 years. Participating household members were initially asked:

- a) *Did [household member] do any work of any type for pay, profit, barter, or home use during the last seven days? If the respondents answered No then the respondent was asked*
- b) *Did you have a job or own farm enterprise at which you did not work during the last seven days and to which you will definitely return to work?*

A yes response to either question was classified as "currently working" and a no response to both questions was classified as "not working/unemployed." Working respondents were then asked a series of questions on first, whether the work they did was waged and if so their earnings, and second, whether they were involved in business or self-employed activity (other than agriculture) and if so, the net profit from this business.

Questions on waged work

- a) *Did [household member] do any wage work during the last seven days? If No*
- b) *Did [household member] do any wage work during the last 12 months?*

If a respondent reported *Yes* to either question he/she was asked the following:

- c) *How much was [household member] last payment IF RESPONDENT HAS NOT YET BEEN PAID what payment do you expect? What period of time did this payment cover [hour; day; week; fortnight; month; quarter year; half year; year]?*
- d) *Does [household member] receive any payment for this work in any other form (apart from salary)? If Yes, What is the value of those payments and over what time interval [hour; day; week; fortnight; month; quarter year; half year; year]?*

Questions on self-employment

e) *Did you operate any business or do any self-employed activity during the last week, other than agriculture? If No*

f) *Did you operate any business or do any self-employed activity during the last 12 months other than agriculture?*

If a respondent reported *Yes* to one question he/she was asked:

g) *What was your net income (profit) from your business or businesses last week/month?*

Violence against women module

The module on violence against women asked the following questions:

Has your current partner or, any partner ever....

a) *Slapped you or thrown something at you that could hurt you?*

b) *Pushed you or shoved you?*

c) *Hit you with his fist or with something else that could hurt you?*

d) *Kicked you, dragged you, or beaten you up?*

e) *Choked or burnt you on purpose?*

f) *Threatened to use or actually used a gun, knife, or other weapon against you?*

g) *Physically force you to have sexual intercourse when you did not want to?*

h) *Did you ever have sexual intercourse you did not want because you were afraid of what he might do?*

If a respondent reported that she had ever experienced any of these acts, she was then asked if it had happened in the past 12 months.

Analysis methods

This section describes the analytical approach used in this study detailing the sample, variables and the econometric methods used.

Variables used in the analysis

Dependent variable: The analysis in this study focused primarily on women's earnings from formal waged work and non-agricultural self-employment. Women's weekly earnings were estimated using information on the last payment women received from formal waged work and the net income for non-agricultural self-employment. Payment from formal waged work was divided by 52, 26, 13, 4.33

and two for respondents reporting that their last payment was for the year, half year, quarter year, month, or fortnight respectively. The number of hours worked in the last week was taken into consideration to estimate weekly earnings for respondents who reported their last payment covered an hour or a day. For respondents reporting that their last payment covered an hour, this figure was multiplied by the number of hours the respondent reported that they had worked in the previous week. For respondents who reported their income covered a day, this figure was multiplied by the number of hours the respondent reported they worked in the previous week divided by nine. For respondents who earned an income through non-agricultural self-employment and reported a net income for a month, this figure was divided by 4.33.³

This study also explored the relationship between partner violence and women's occupational type that was measured as a categorical indicator and coded as follows: not working/unemployed—0; primarily in self-employed agricultural work—1; primarily in self-employed non-agricultural work—2; and primarily in formal public/private work—3.

Independent variables/covariates:

This study explored the relationship between women's earnings and occupational type using four measures of partner violence. The first two measures were identified if a woman reported yes to ever having experienced one or more acts of physical or sexual violence—lifetime physical and/or sexual violence—and if a woman reported to having experienced one or more acts of physical or sexual violence in the 12 months to interview—current physical and/or sexual violence.

To explore whether women's earnings are more greatly affected by the severity of physical violence, two additional measures were identified. Lifetime physical (severe) and/or sexual violence was identified if a woman reported yes to ever having experienced one or more acts of severe physical (hit with fist; kicked, dragged or beaten; choked or burnt; and threatened or used a gun, knife or other weapon) or sexual violence, and current physical (severe) and/or sexual violence was identified if a woman reported she had experienced one or more of these acts in the 12 months to interview.

Additional women's socio-demographic characteristics included: age; partnership status coded married monogamous—1, married polygamous—2, cohabiting—3; years of schooling; and a binary

³ Income from businesses that were shared with a partner was divided by two and self-employed income also includes net profit from second businesses.

indicator of women's attitude towards the acceptability of wife-beating based on the opinion that a man has a good reason to hit his wife under certain circumstances.⁴

Household characteristics included: number of children under 15 living in the household; household socioeconomic status; and household income. Household socioeconomic status was measured by creating an index combining indicators of household durable items (radio, mobile, refrigerator, television, video, computer, stove, water-heater, car, motorbike, air-conditioning, satellite dish) with housing characteristics (main source of drinking water; type of toilet facility; main material used for outside wall, roof, and floor). Weights for the individual variables were derived using principal components analysis with the first principal component measuring household socioeconomic status. The first principal component explained 26.8 percent of the variation in the original variables. Cluster analysis was then used to divide households into five socioeconomic groups "poorest," "middle poor," "middle," "middle rich," and "richest" [31]. Household income was established by summing each household member's income from formal waged work and from non-agricultural self-employment.

The characteristics relating to the respondents partners included: age; years of schooling; occupational type coded not working/unemployed—0, primarily in self-employed agricultural work—1, primarily worked in self-employed non-agricultural—2, primarily in formal private sector work—3, and primarily in formal public sector work—4; and whether or not he consumed alcohol in the last 7 days.

Analysis sample

The analysis in this study is based on the sample of currently partnered women living in the same household as their partner that answered the module on violence against women (n=1837).⁵

Data analysis

All analyses were conducted using STATA version 10.0 software [32]. Population estimates were derived using the "svy" survey estimation procedures to take into account the stratified multistage sampling design [33]. The analysis between women's earnings and lifetime physical (severe) and/or sexual violence and both measures of current partner violence were restricted to the subpopulation of women who either experienced the violence measured or who had never been abused. For example, the analysis with current physical and/or sexual violence excluded women who had experienced

⁴ The following eight circumstances were: she goes out without telling him; she neglects the children; she argues with him; refuses to have sex with him; there are problems with his or her family; there are money problems; there is no food at home; other reason.

⁵ From the initial sample of 3,588 who responded to the module on VAW, 1,535 were dropped because they were not currently partnered (1,080 never married; 292 separated/divorced; 163 widowed); four were dropped because they were above the age cutoff of 50 years; and 211 were dropped because their partner was not living in the household.

physical and/or sexual violence in their lifetime but not in the past 12 months. This was done to avoid diluting the associations estimated.

Estimating the relationship between women's earnings and partner violence is challenging because of the non-randomness of both women's selection into employment (and subsequent earnings) and women's experiences of partner violence. In addition, unobservable factors that influence both women's earnings and their experience of partner violence make inferring a causal relationship difficult.

Studies that have explored the relationship between women's earnings and partner violence have used different methods. A recent study used ordinary least square approach to explore the effect of sexual violence on young adolescent women's earnings in the US using longitudinal data [34]. Morisson and Orlando (1999) used Heckman's selection models to account for the non-randomness of women's selection into employment to understand the determinants of women's earnings in Nicaragua and Chile, and Duvvury et al. (2012) used two-stage least square instrumental variable regression approach to estimate earnings on the sample of women that were in work in Vietnam [6-7]. By using an instrumental variable approach Duvvury et al. (2012) were able to address the issues of non-randomness of partner violence and unobserved heterogeneity. Finally, Morisson and Orlando (2004) used propensity score matching (PSM) methods to explore the association between partner violence and women's labor market outcomes—an approach that addresses the non-randomness of partner violence but not unobserved heterogeneity [35].

The question of interest in this study is to estimate the productivity loss (loss in women's earnings) associated with partner violence. Therefore, the PSM approach was used to estimate an unbiased difference in earnings between abused and never abused women. A two-stage least square approach could not be used because no good instrumental variable could be conceptualized in this study.

The PSM approach matches abused women with non-abused women who are as alike as possible in terms of their probability of experiencing abuse—the propensity score. The propensity scores are estimated from a set of observed characteristics (covariates) and abused and non-abused women are matched so that the distribution of these covariates among abused women is similar to the distribution of the covariates among non-abused women. By conditioning on these covariates, any difference in earnings between matched abused and non-abused women is assumed to exist as a result of partner violence—known as the conditional independence assumption. Abused and non-abused women are matched where the distributions of their respective propensity scores overlap—the area of common support. Cases where there are not common propensity scores are dropped from the analysis. An

implication of this is that the smaller the area of common support the fewer cases are able to be matched, therefore, reducing the generalizability of the findings [36-37].

Several matching estimators exist:

- Nearest Neighbor: abused women are matched to one or more non-abused women who have the closest propensity score
- Kernel: abused women are matched with a weighted sum of all non-abused women with greater weight given to non-abused women who have a closer propensity score
- Radius: abused women are matched to non-abused women whose propensity score lies within a defined proximity (calliper) to each abused woman

In this study PSM analyses were conducted for Total Tanzania and for urban and rural Tanzania separately. First each woman's probability of experiencing abuse—the propensity score—was estimated using the Probit estimator. An issue that arises in choosing covariates to determine the propensity score is that PSM will be biased if factors that determine whether or not women experienced partner violence are omitted from the Probit model. Over-parameterizing the model, however, increases the risk that abused women are not matched [37].⁶ The covariates used in this analysis were guided by a recent study on factors associated with partner violence in urban and rural Tanzania using the 2010 Tanzania DHS. The analysis drew from an ecological framework that maps out risk and protective factors theorized and found empirically to be associated with partner violence against women from different disciplinary fields e.g. sociology, psychology, and economics [38].

The Tanzania DHS study found that women's ownership of land and/or a house; acceptance towards wife beating; mother being hit by her father; and partner being sometimes or often drunk were significantly associated with increased risk of partner violence in both urban and rural areas. In addition, in urban areas women's higher age was significantly associated with reduced risk, whereas in rural areas polygamy, lower partner educational attainment, and partner not working/unemployed were significantly associated with increased risk [39]. Other covariates that are hypothesized to be associated with partner violence are higher number of children in the household and lower household socioeconomic status. Except for information on women's ownership of land or a house and women's exposure to violence in childhood, all other covariate information was available in the Tanzania NPS. Partner history of arrest was also considered as a covariate; however, a descriptive analysis of this indicator revealed very few women's partner (less than 1 percent) had ever been arrested.

⁶ A perfectly predictive model would result in all abused cases being assigned a propensity score of 1 and all non-abused cases a propensity score of 0 resulting in no possible matches.

Starting with the simplest model that included only women's age, additional covariates were added until the balancing property was satisfied—a diagnostic tool used to confirm whether similar propensity scores for abused and non-abused women have the same distribution of covariates. The final model used in all the analyses included: women's age; relationship status; years of schooling; attitudes to physical violence, number of children in the household; household socioeconomic status; partner age; partner years of schooling; partner occupational status; and partner alcohol consumption in the past week.

The results of each Probit model are shown in Annex 1 to 3. For urban and rural Tanzania combined, the findings reveal that women's higher age was significantly and positively associated with both lifetime measures of partner violence—but not with either measure of current partner violence—by virtue of older women being exposed to partner violence for longer (Annex 1). Working in the past year was significantly associated with higher lifetime and current physical and/or sexual violence. Among the consistent predictors of abuse were women's attitudes towards acceptance of partner violence, lower household socioeconomic status and partner alcohol use that were associated with higher risk of abuse, and being in a monogamous marriage and higher partner age that decreased women's risk of abuse. The number of children in the household and women's and their partners' higher years of education were not significantly associated with abuse. The Pseudo R² measure of goodness of fit and the percent correctly classified ranged between 0.067-0.081 and between 73.20 percent-85.75 percent.

In urban areas, women who were in a monogamous marriage were significantly less likely to have experienced any of the measures of partner violence (Annex 2). Women who worked in the past year and women's acceptance towards wife-beating were associated with significantly higher risk of lifetime and current physical and/or sexual violence. Higher partner years of education reduced women's risk of lifetime physical (severe) and/or sexual violence and both measures of current partner violence. Partner alcohol consumption in the previous week increased women's risk of current physical and/or sexual violence. The Pseudo R² and the percent correctly classified ranged between 0.087- 0.128 and between 79.52 percent-90.10 percent.

In rural areas women's acceptance towards wife-beating; partner alcohol consumption in the past week; and women whose partners were not working/unemployed were at significantly increased risk of abuse, while higher partner age significantly reduced women's risk of abuse (Annex 3). In addition, women's higher age increased their risk of lifetime physical (severe) and/or sexual violence. Compared to the poorest households, higher socioeconomic status households was associated with

decreased risk of abuse, and significantly so for the middle socioeconomic groups. The Pseudo R^2 and the percent correctly classified ranged between 0.053- 0.071 and between 70.00 percent-83.21 percent.

For all models, the vast majority of cases fell within the area of common support including virtually all cases of abused women. In this study all three matching estimators were used and for the radius matching method two calliper widths were defined: $r=0.001$ and $r=0.01$. Survey weights were not used to estimate the propensity scores because the scores were used only to match abused and non-abused women, but were used to estimate population differences in weekly income [40].

RESULTS

This section presents the results and is divided into three sub-sections. First, descriptive information is presented on women's and their partners' socio-demographic characteristics and weekly incomes, and on the prevalence of partner violence. This is followed by an analysis on the relationship between women's labor market characteristic and partner violence. Finally, estimates of the macroeconomic costs of violence against women in Tanzania are presented.

Women's socio-demographic characteristics and partner violence

This sub-section presents descriptive information on the study population characteristics, men and women's average weekly earnings, and the prevalence of partner violence and help seeking behavior among the victims. The findings are presented separately for urban and rural areas. The results are based on the sub-population of women aged 15-50 who responded to the module on violence against women and who were currently married/cohabiting and living in the same household as their partner at the time of the survey.

Women and partner socio-demographic characteristics

The mean age of women was almost 32 years (Table 1) and the majority were married either monogamous (75.6 percent) or polygamous (10.2 percent). Almost one-quarter of women had never been to school and few (7.1 percent) had post primary school education. The vast majority of women (90.2 percent) worked outside the home in the last year and the most common employment sector was self-employed agriculture. Very few women, however, worked in the formal public/private sector. Thirty percent of all women had earned money from either non-agricultural self-employment or formal public/private waged work.

Almost 60 percent of women agreed with at least one of the eight reasons for it to be justifiable for a man to beat his wife. The most common reasons were if a woman neglects the children; goes out without telling him; refuses to have sex; or argues with him—approximately 40 percent agreed with

each reason. The least common reasons were if there were money or family problems—less than 5 percent for either reason.

Over half of all households were classified in the poorest household socioeconomic group and just below 10 percent were classified in the top two highest socioeconomic groups. The mean age of women's partners was just below 40 years and 13.5 percent had never been to school. Fifteen per cent of women's partners had consumed alcohol in the last week. Virtually all men had worked in the last year, most commonly in self-employed agriculture (70.2 percent) while 14.7 percent were in formal public/private work. More than half (56.9 percent) earned money from non-agricultural self-employment or formal public/private waged work.

The majority of women's socio-demographic characteristics were significantly different between urban and rural Tanzania. Compared to rural areas, women in urban areas were significantly more likely to be in a cohabiting relationship and to have higher educational attainment—on average 2.3 years more. However, urban women were significantly less likely to have worked in the last year compared to rural women—virtually all rural women had worked in the last year and predominantly in self-employed agriculture. Despite this difference, urban women were more likely to earn money from non-agricultural self-employment or formal public/private waged work compared to rural women (40.5 percent compared to 27.4 percent respectively). Rural women were significantly more likely to be in a polygamous marriage, to live in poorer socioeconomic status households and to reside in households with a higher number of children. There was no significant difference in women's mean age and attitudes to wife beating between urban and rural areas.

Almost all partner characteristics were significantly different between urban and rural areas. In urban areas, women's partners had higher educational attainment—on average 2.3 years more—and significantly more earned money from non-agricultural self-employment or formal public/private waged work—84.6 percent compared to slightly less than one-half of men in rural areas. There was no difference in men's mean age and the proportion of men who consumed alcohol in the last week between the two settings.

Average weekly income from non-agriculture self-employment or formal waged work

The average total weekly income (non-agricultural self-employment and formal waged work) among women who earned money was 18214 Tzs (\$14.10 US) (Table 2).⁷ Average weekly income from non-agricultural self-employment was slightly higher than from formal waged work (17182 Tzs (\$13.30 US) and 15920 Tzs (\$12.30 US) respectively).

The average total weekly household income (aggregated across all household members) was 62526 Tzs (\$48.30 US). While women's partners' average total weekly income was 58809 Tzs (\$45.45 US) further analysis highlighted the highly skewed nature of their earnings. The top 3 percent of male income earners reported their weekly income to be, on average, 860456 Tzs (\$665.00 US). Excluding these from the sample of men who earned money reduced the average weekly income by approximately one-third to 39,200 Tzs (\$30.30 US). A similar analysis of women's income revealed that while the top 3 percent reported they earned, on average, 41,3550 Tzs (\$320.00 US) a week, excluding these women from the sample reduced the average weekly income to 15,675 Tzs (\$12.10 US) a week—a decrease of approximately 2,500 Tzs (\$2.00 US) a week. The very high incomes reported by a small percentage of the sample may, to some extent, reflect regional inequality as 58 percent of the top male income earners and 75 percent of the top female income earners lived in Dar es Salaam—Tanzania's commercial centre.

Women who earned money from non-agricultural self-employment or formal waged work contributed slightly less than half of the total weekly household income (47.84 percent *std. err.* 1.58) and in households where both women and their partners earned an income (23.1 percent of all households), women's earnings were, on average, 143 percent higher than their partners (*std. err.* 29.12).

Women's, their partners and total household weekly income were all significantly higher in urban areas compared to rural areas. Women's total weekly earnings in urban areas were, on average, more than twice as high as women's total weekly earnings in rural areas, and women's weekly earnings from formal waged work was more than four times higher.

Prevalence of partner violence

Slightly over 32 percent of women had experienced physical and/or sexual violence by an intimate partner at some time in their lives (Table 3). The prevalence of lifetime physical violence was almost the same (30.3 percent) indicating the presence of physical violence in virtually all lifetime cases of partner violence. Eleven percent had experienced sexual violence in their lifetime. The prevalence of

⁷ Average exchange rate between Oct. 31, 2008-Oct. 31, 2009 1 USD: 1,293.78 Tzs. Source www.oanda.com/currency/historical-rates/ accessed June 29, 2013

current physical and/or sexual violence was 19.1 percent with 16.0 percent reporting that they had experienced physical violence and 8.4 percent reporting that they had experienced sexual violence.

The most common act of physical violence reported, both lifetime and current, was being slapped and this was experienced by the majority of women who reported physical violence (lifetime 76.2 percent (23.1/30.3); current 66.9 percent (10.7/16.0)). When considering the prevalence of physical violence by severity, the results show that more women experienced severe physical violence than women who experienced moderate physical violence only, e.g., for current prevalence 9.8 percent of women reported they had experienced severe physical violence compared to 6.7 percent who reported they had experienced moderate physical violence only.

Partner violence was categorised into mutually exclusive “types”—physical violence only, sexual violence only, and both physical and sexual violence. Of women who had experienced physical and/or sexual violence in their lifetime, over one-quarter (27.8 percent) had experienced both physical and sexual violence. This proportion remained virtually the same when considering the distribution of the categories among women who had experienced partner violence in the past year. Almost two-thirds (65.8 percent) had experienced physical violence only in their lifetime compared with 56.0 percent of currently abused women. While 6.4 percent of abused women experienced sexual violence (but not physical violence) in their lifetime, this figure was more than double (16.6 percent) for current prevalence.

The extent to which partner violence had permanently or temporarily ceased—defined as lifetime experience of physical and/or sexual partner violence but not in the past 12 months—was also explored. Partner violence had ceased for 40.9 percent of women who had ever experienced physical and/or sexual violence. By type of partner violence the rate of permanent or temporary cessation was: 51.8 percent for women who experienced physical violence only; 21.4 percent for women who experienced sexual violence only; and 19.8 percent for women who experienced both physical and sexual violence. The rate of partner violence cessation was significantly different between physical violence only and sexual violence only ($p=0.001$) and between physical violence only and both physical and sexual violence ($p<0.001$), but there was no significant difference in the rate of partner violence cessation between sexual violence only and both physical and sexual violence ($p=0.876$).

Of the women who had ever experienced partner violence, 55.2 percent reported seeking help after an incident and in the vast majority of cases sought help from an informal source i.e. family or village/community or religious leaders. Less than 7 percent of women sought help either from the police, health service or NGO.

When considering urban and rural women's experiences of partner violence separately, prevalence of all measures, and most acts, of partner violence were higher for rural women. Among abused women, rural women were more likely than urban women to have sought help, though in both areas almost all women who sought help went to an informal source.

Women's labor market outcomes and partner violence

This section explores the relationship between women's occupational types and weekly earnings and partner violence. The first part presents bi-variate findings on women's occupation types and the second part explores the relationship with women's weekly earnings using PSM methods to account for the potential bias that may arise because of the non-randomness of partner violence.

Women's occupational types and partner violence

The proportion of women experiencing partner violence by different occupation types is shown in Table 4. The findings suggest that partner violence and women's self-employed work is positively linked. Prevalence of lifetime physical and/or sexual violence was highest among women who were in self-employed non-agricultural and agricultural work (35.2 percent and 33.6 percent respectively), but was lowest among women in formal public/private work (18.0 percent).

These patterns were mirrored when considering prevalence of lifetime physical (severe) physical and/or sexual violence and current partner violence. For example, almost one-fifth of women working in self-employed agriculture experienced physical (severe) and/or sexual violence in the past year compared with 3.8 percent of women in formal public/private work.

In both urban and rural Tanzania, partner violence was highest among women who were in non-agricultural self-employment. In urban areas prevalence of all measures of partner violence were lowest among women in formal public/private work, while in rural areas prevalence of both measures of lifetime partner violence were lowest among women who had were not working/unemployed.

Women's weekly earnings and partner violence

Tables 5-7 show women's average weekly earnings and the mean differences in earnings by abused and non-abused status. Five methods were used to calculate weekly earnings and the mean difference. The first calculates average weekly earnings and mean difference across the sample and is termed the "total sample estimate". The findings from this analysis, however, may be subject to bias if the non-randomness of partner violence creates fundamental differences between the group of women who experience abuse and the group of women who do not. To account for potential bias, PSM methods were used to calculate the remaining four estimates using the estimators described in the Methods section.

Women's total weekly earnings and partner violence

Women's average total weekly earnings were lower for abused women compared with never abused women—a finding that was significant when comparing earnings among currently abused women (Table 5). Compared to never abused women's total weekly earnings (19299 Tzs (\$14.90 US)), women who experienced current physical and/or sexual violence earned 29 percent less and women who experienced current physical (severe) and/or sexual violence earned 43 percent less. The findings from the PSM analyses yielded similar results to the total sample estimate when comparing earnings between women who experienced current physical and/or sexual violence and never abused women—earnings among the former group were between 27 percent-34 percent less. The difference in total weekly earnings were, however, slightly higher when comparing earnings between women who experienced current physical (severe) and/or sexual violence and never abused women, where earnings among this classification of abused women were between 47 percent-53 percent less.

Women's weekly earnings from self-employed non-agricultural work and partner violence

The total sample estimates revealed that women's weekly earnings from self-employed non-agricultural work were lower among currently abused women and lowest among women who experienced physical (severe) and/or sexual violence, however, neither finding was significant (Table 6). There were virtually no differences in earnings between women abused in their lifetime and never abused women. The PSM analysis, however, yielded significantly different results when comparing weekly earnings between currently abused and never abused women. Among women who experienced current physical and/or sexual violence, earnings were between 29 percent-31 percent less, and the percent difference increased to between 44 percent-48 percent less among women who experienced current physical (severe) and/or sexual violence. In addition, while not yielding significant associations, the PSM estimators resulted in substantially greater differences in earnings between women who had been abused in their lifetime and never abused women.

Women's weekly earnings from formal public/private waged work and partner violence

Women's weekly earnings (total sample estimate) from formal public/private work were lowest among women who experienced lifetime and current physical (severe) and/or sexual violence—earnings for both groups were significantly lower than that for never abused women (Table 7). The PSM analysis corroborated the total sample estimates revealing that the greatest differences in earnings were among women who experienced physical (severe) and/or sexual violence. Earnings among women who experienced physical (severe) and/or sexual violence (both lifetime and current) were between 57 percent-61 percent lower than never abused women—a reduction that is similar to the total sample estimate. Earnings among women who experienced lifetime physical and/or sexual

violence were 41 percent lower (66 percent lower if considering the radius matching estimator with calliper width of $r=0.001$) than never abused women, and earnings among women who experienced current physical and/or sexual violence were 47 percent lower (73 percent less if considering the radius matching estimator with the lowest calliper) than never abused women.

Women's total weekly earnings and partner violence in urban and rural areas

In both urban and rural areas average total weekly earnings were lowest among women who experienced physical (severe) and/or sexual violence in the past year (Tables 8 and 9). In urban areas, considering the total sample estimate, earnings among women who experienced physical (severe) and/or sexual violence earned 38 percent less (lifetime abuse) and 45 percent less (current abuse) than never abused women's earnings (Table 8). The PSM estimates show earnings among women who experienced lifetime physical (severe) and/or sexual violence were between 35 percent-47 percent less, and among women who experienced current physical (severe) and/or sexual violence, earnings were 39 percent less.

In rural areas, women's incomes were higher among women who experienced either measure of lifetime violence when compared with never abused women (both total sample estimate and estimates from PSM) (Table 9). However, no differences in total weekly earnings between lifetime abused women and never abused women were statistically significant. The findings with current abuse reversed the association and earnings among currently abused women were lower, but not significantly when considering the total sample estimate. The matching estimators, however, revealed significant differences. Earnings among women who experienced current physical and/or sexual violence was 21 percent less than never abused women and, earnings were 24 percent-26 percent lower among women who experienced physical (severe) and/or sexual violence in the previous 12 months.

Estimating the potential income loss to Tanzania GDP because of partner violence

The results from the previous section highlights that abused women earn significantly less than never abused women even after accounting for observable characteristics that may affect women's earnings. Exploiting the national representativeness of the Tanzania NPS survey, the potential loss to Tanzania GDP, as a result of partner violence, was estimated using information on the prevalence of current physical and/or sexual violence and the mean weekly income. According to the 2010 Tanzania DHS estimate, the female population was 24,115,000 of which 10,248,875 (42.5 percent) were between the ages of 15-50. Using population estimates from the Tanzania NPS there were 2,599,115 ever partnered women in paid non-agricultural self-employment or formal work. The unadjusted mean

difference in weekly income that currently abused and non-abused women earned was 7627 Tzs (US\$5.90) and this amounted to 396,561 Tzs (US\$306.50) in a year.

Multiplying this difference in annual income by the total number of women who had experienced physical and/or sexual partner violence in the previous 12 months—538,789 (95 percent CI 451,771—625,806) yielded a potential income loss of 214 billion Tzs (179 billion Tzs—234 billion Tzs) or just over US\$165 million (US\$138 million-\$192 million). This amounted to 0.77 percent (0.65 percent—0.90 percent) of Tanzania's GDP.

An issue with the Tanzania NPS is, however, that the prevalence of partner violence is lower than that reported in the 2010 Tanzania DHS. The prevalence of past year physical and/or sexual partner violence among women who earned a cash income in the past year in the 2010 Tanzania DHS was 32.6 percent (95 CI 29.5 percent—35.8 percent) that totaled 848,166 (95 percent CI 765,775—930,558) abused women. Using this estimate, the potential income loss came to 336 billion Tzs (95 percent CI 304 billion Tzs—369 billion Tzs) or US\$260 million (95 percent CI US\$234 million- \$285 million). This amounted to 1.22 percent (1.10 percent-1.33 percent) of Tanzania's GDP.

Another way to express the potential loss of income to Tanzania's GDP is that each percentage point of partner violence costs just over 10 billion Tzs or almost US\$8 million and amounts to 0.04 percent of Tanzania's GDP.

DISCUSSION OF MAIN FINDINGS

This study has sought to explore the relationship between Tanzanian women's labor market characteristics, in particular women's earnings from formal public/private work and non-agricultural self-employment, and partner violence using the 2008-09 Tanzania NPS. Before discussing the main findings several limitations need to be highlighted. First, the prevalence of partner violence documented in the Tanzania NPS is lower than that documented in the 2010 Tanzania DHS—the only other nationally representative survey to document recent prevalence of partner violence. The reason for this difference is likely because of several factors including that some of the interviewers administering the survey, and the module on violence against women, were male; that women's partners may have been present in the household, though not present during the interview on violence; and that the structure of the survey may not have enabled a rapport to have been built between the interviewer and the respondents thus reducing the likelihood of women disclosing their experiences of partner violence [41]. Second is unobserved heterogeneity i.e. that the causal relationship between partner violence and labor market outcomes could not be established. While the Tanzania NPS collects information from the same households over time, the module on violence against women was

not administered in subsequent waves and therefore, it was not possible to assess the effect of changes in women's abuse status and employment outcomes.

Nevertheless, the first wave of the Tanzania NPS provides an important opportunity to explore the relationship between women's earnings and partner violence. A methodological approach that would have addressed the issue of unobserved heterogeneity is to use an instrumental variable. This would involve identifying a variable that is correlated with partner violence but not with women's earnings. However, for this analysis, no such variable could be conceptualized from the Tanzania NPS. This study did use PSM methods to address the issue of the non-randomness of partner violence. By matching women who are as alike as possible in terms of the characteristics that predict whether or not a woman experiences partner violence, PSM attempts to reduce this potential bias. Limitations of PSM methods are that it does not account for the fact that women who experience partner violence and women who don't may differ in unmeasured ways; the generalizability of the findings depend on the extent of common support; and it relies on large sample sizes [42-43]. In this study the size of common support was vast and included virtually all abused women. Breaking down earnings into its sectoral (formal public/private work/ non-agricultural self-employment) and regional (urban/rural) components, however, reduced the sample size. Despite these limitations, PSM is a useful evaluation tool when data are collected in a cross-sectional format.

Using the 2010 Tanzania DHS prevalence estimates on past year partner violence, the difference in earnings between abused and non-abused women amounted to 1.22 percent of Tanzania's GDP. While this is slightly lower than estimates from other studies—i.e. 1.60 percent (Nicaragua); 2.00 percent (Chile); and 1.78 percent (Vietnam)—the loss to GDP estimate found in this study is based on earnings from two sectors: formal public/private work and self-employed non-agriculture accounting for one-third of working women. Information on earnings from self-employed agriculture—the largest employment sector for women accounting for more than three-quarters of all women—was not collected in the Tanzania NPS and had they been included, it is likely that the estimate of lost earnings to GDP would have been much higher.

Consistent with other studies were the findings on the extent to which abused women's earnings were lower than never abused women's earnings. Compared to never abused women, the greatest difference in total weekly earnings were observed among women who had experienced physical (severe) and/or sexual violence in the past year—a percent decline that ranged from 43 percent (total sample estimate) to 53 percent (PSM method). This is similar to the decline severely abused women experienced in Chile (61 percent) and Nicaragua (43 percent). The productivity loss, however, appeared to be more greatly felt by women in formal public/private waged work—where severely abused women (both lifetime and current) experienced a decline in earnings of 60 percent—and by

women in urban areas—where severely abused women in the past year experienced approximately a 40 percent decline in earnings.

The prevalence of partner violence was lowest among women in formal waged work. This is in contrast to the finding that the prevalence of partner violence is highest among women in self-employed (both agricultural and non-agricultural) work—a finding that persists when stratifying by urban and rural areas. Exactly why formal public/private work is associated with the lowest prevalence of partner violence and why the highest prevalence of partner is found among self-employed women is not certain. It might be that the income stability associated with formal sector work enhances women’s status within the household and is therefore, protective, whereas the irregular/seasonal nature of self-employed work may not be sufficient to strengthen women’s position within the household [42].

Alternatively, some forms of self-employment may create conflict within the household or it might be that abused women need to earn money with self-employment being the most feasible option. These themes came through in a recent qualitative study among female market traders in Tanzania [44]. The study documented that some women felt their income earning work was perceived by their partner as a strategy to meet other men and that created tensions in the household. Other women who had experienced partner violence expressed they felt that they had no choice but to work and earn money to feed their families. These women spoke openly about how their violent partners were often drunk, engaged in relationships with other women and contributed very little to the household [44].

The scale of partner violence against women who are in self-employed work is a concern and should be monitored as current trends show increasing numbers of women are entering into informal trading activities. Also, development programmes aimed at improving women’s, and adolescent girls, earning potential should consider the potential impact on women’s risk of violence. Microfinance programs, widely implemented in LMIC, are an example of an intervention that aims to support poor households through the provision of loans, often to women to help them set up in business. Few studies, however, have evaluated its impact on women’s risk of partner violence, and current evidence suggests that this effect may be positive or negative [45]. The IMAGE intervention in South Africa, that combined microfinance with gender training, halved the level of violence among program participants, and highlights that in addition to economic empowerment efforts, addressing gender norms is necessary to the ending violence against women [46].

CONCLUSION

This study has shed light on the complex relationship between women's labor market outcomes (occupational type and weekly earnings) and partner violence in Tanzania. It adds to existing evidence and confirms that the financial costs of partner violence at the individual level and to the domestic economy are substantial. The findings from this study are, however, only part of the picture and the true cost to Tanzania's GDP is likely to be much greater when considering the cost that may be associated with self-employed agricultural work, the direct cost of seeking help, and the cost of missed domestic housework because of partner violence. Greater research is also required on these aspects of costs.

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