




Spousal effects on wages, labour supply and household production in Ghana



Authors:

Emmanuel Orkoh¹ 
Phillip F. Blaauw¹ 
Carike Claassen¹ 

Affiliations:

¹TRADE Research Entity,
Faculty of Economic and
Management Sciences,
North-West University,
Potchefstroom, South Africa

Corresponding author:

Emmanuel Orkoh,
aorkoh@gmail.com

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Background: The relationship between spousal wages and hours of work, including the phenomenon of a spousal premium or penalty, is well documented in the literature. However, there is limited information on the situation in developing countries where labour market rigidities and cultural norms are factors in the division of labour between husbands and wives.

Aim: This article addresses the research gap by analysing spousal wages among couples and the cross-wage effect of spousal time allocation.

Setting: Households in Ghana, where sociocultural norms largely influence the role of men and women constituted the context of the study.

Methods: The instrumental variable Tobit estimation regression was used to analyse pooled data from three Ghana Living Standard Surveys.

Results: The results reveal elements of a working spousal wage premium (due to positive selection rather than specialisation) for both men and women regardless of their ethnic affiliations. The analysis of the effect of wage on spousal hours of work also suggested complementarity in employment and household labour decisions between couples.

Conclusion: Men's and women's participation in household production significantly improves each other's labour market participation and labour supply. These results corroborate the evidence of a wage premium in the literature. We recommend that government should promote equitable wage rates in the labour market and prioritise policies such as paternal leave which could encourage men to participate in household production and indirectly promote women's labour force participation.

Keywords: spousal wage; time allocation; two-step instrumental variable Tobit; couples; Ghana.

Introduction

The theory of working spouse premium or penalty postulates that a spouse's hours of work impact their partner's wages while the theory of labour supply suggests that spouses' wages influence their partners' hours of work (Killewald & Gough 2013; Song 2007; Weeden, Cha & Bucca 2016). These seemingly contradicting theories have attracted a vast amount of empirical literature in developed countries (Glauber 2007; Kelly & Grant 2012; Killewald 2013; Schmitt 2010). However, very limited evidence exists in developing countries where labour market rigidities, social norms and cultural values play an important role in shaping the extent of validity (or otherwise) of these theories (Petersen, Penner & Hogsnes 2011). Most of the studies on marriage premiums or penalties have focused mainly on the husband. According to Breusch and Gray (2004), the little evidence that is available shows positive (but small), zero or even negative effects of marriage on women's remuneration. In many developing countries, social norms and cultural practices influence intra-household bargaining power, gender roles and resources allocation (Doss 2013). This means that analysis of the determinants of labour market outcomes and household production need to be context specific.

This article contributes to the empirical discourse by extending the debate to include unpaid hours of household work. In this regard, the article analyses the simultaneous determination of spousal wages and time allocation to paid and unpaid work activities in Ghana, which provided the setting for the study. The first specific objective of the article is to estimate the spousal hourly wages among couples. Under this objective, the effects of the husband's hours of paid and unpaid work on the wife's hourly wages and the effects of the wife's hours of paid and unpaid work on the husband's hourly wages are analysed. The second objective estimates the cross-wage effect of spousal time allocation. The effects of the husband's hourly wages on the wife's hours of paid and unpaid work

are assessed. Similarly, the effect of the wife's hourly wages on the husband's hours of paid and unpaid work is examined.

Following the feedback effect between the labour market and household conditions, the article extends the analysis to include the wife's and husband's hours of unpaid work or household production. More importantly, it explores the evidence of the premium or penalty from a developing country perspective, where the literature on these phenomena is sparse. To the best of the authors' knowledge, this is the first article to provide evidence on these issues from a multi-ethnic Ghanaian perspective. Also, both nominal and real wages are considered in this analysis to assess the implicit effects of inflation on spousal time allocation. This article specifically contributes to the design of family-oriented labour market policies on wage determination which can assist in altering gender inequality in intra-household time allocation to labour supply and household production in Ghana and other developing countries. The next section of the article presents the literature while the subsequent sections discuss the methodology, the empirical estimation techniques and the data used in the analysis. This is followed by a discussion on the results. The article ends with a conclusion and some policy recommendations.

Literature review

This section is divided into two subsections. The first presents the literature on the spousal wage premium and wage penalty. The second focuses on the spousal wage and hours of work. We separate the review into these two theoretical perspectives in order to discuss their variant versions and the available empirical studies that have attempted to validate them in detail.

Spousal wage premium and wage penalty

The notion of a spousal wage premium suggests that marriage is associated with higher wages which mostly favour men while the theory of a spousal wage penalty posits that marriage contributes to lower wages with women being the most disadvantaged. The source of the premium has been explained from three theoretical perspectives: (1) the 'specialisation thesis', (2) the 'selection hypothesis' and (3) productivity theory (Barg & Beblo 2007; Strike 2012). The specialisation thesis postulates that the division of labour in the household enables married men to specialise in market production and earn higher wages than their unmarried counterparts because they spend less time on home production (Becker 1991; Chun & Lee 2001; Gray 1997; Korenman & Neumark 1991; Song 2007). Contrary to this hypothesis is the selection hypothesis which indicates that married men, who earn above average wages, have certain observable qualities such as trustworthiness, stability and competence which make them more valuable in the marriage and labour market (Chun & Lee 2001). The productivity theory also suggests that marriage makes men more productive in the labour market because they feel a sense of financial responsibility from home (Hill 1979; Strike 2012).

Empirical validations of these theoretical debates in the United States (US) indicate that on average, married men earn higher wages than their unmarried counterparts, but the opposite appears to be true for married women (Groothuis & Gabriel 2010). The premium among men is estimated to be within the range of 15% and 32% (Bartlett & Callahan 1984; Korenman & Neumark 1991). Chun and Lee (2001) used the Standard Mincer-type human capital function to analyse the 1999 US Current Population Survey data and estimated the average premium to be 12.6%, but 3.4% for husbands whose wives worked full time and 31.4% for husbands whose wives were not in the labour force. A comprehensive review of the production, specialisation and selection theories particularly in the US suggests that although no single theory completely captures all the sources of the wage premium, the findings of the majority of the empirical studies, support the productivity theory of causal effect of marriage on wages of married men (Groothuis & Gabriel 2010; Hill 1979; Strike 2012). Thus, men become more productive after marriage. Although the productivity theory seems to have gained the most empirical support, some recent studies provide evidence that make the finding less conclusive.

Nakosteen and Zimmer (2001) and Groothuis and Gabriel (2010) drew conclusions that support the selection theory that US men's income and their propensity to marry are positively correlated. Using the 1979–2012 waves of the National Longitudinal Survey of Youth 1979 (NLSY79), Killewald and Lundberg (2017) argue that the observed wage patterns in the US are mostly consistent with men marrying when their wages are already rising more rapidly than expected and divorcing when their wages are already falling, with no additional causal effect of marriage on wages. This conclusion is supported by a recent study that used the same NLSY79 data to argue for the discarding of the notion of a wage premium for married men because selection into marriage operates not only on wage levels but also on wage growth. As a result, men on a steep career track are equally likely to marry (Ludwig & Brüderl 2018).

In an earlier study, Barg and Beblo (2007) indicated that husbands' wages were mostly due to positive selection. As a result, there was weak evidence for specialisation to explain the conditional male wage premium (MWP) between married and cohabiting men. Killewald and Lundberg (2017) assert that marriage changes men's labour market behaviour in ways that augment their wages. However, these changes do not necessarily occur at the expense of women's wages. Unlike the US and some European countries such as the United Kingdom (UK) and Germany, studies in Scandinavian countries such as Sweden, Denmark and Norway do not show substantial marriage premiums (Ludwig & Brüderl 2018).

Contrary to the literature on the notion of a wage premium, other studies in the US have found evidence of a working spouse penalty. Those studies conclude that married men who have gainfully employed wives experience less intra-

household division of labour but they earn lower wages than their counterparts who have non-working wives (Chun & Lee 2001; Gray 1997). This observation has been explained from the perspective of employers' preference for single earners, geographical mobility, productivity and the income effect of wage on spousal labour supply. An explanation for the employers' preference for single earners is that employers perceive single-earner husbands to be more in keeping with social expectations and values than dual-earner husbands. In addition, by virtue of the principle of distributive justice in wage determination, employers consider single-earner husbands to have greater needs than dual-earner husbands; hence the need for the former to be given higher priority (Song 2007).

Regarding geographical mobility, it is argued that dual-earner husbands are less mobile and more prepared to accept discriminatory wage offers. Furthermore, they are perceived by employers as not being productive enough to support their households. As a result, their spouses have to work so that the household can survive. Such perceptions about the productive capability of dual-earner husbands work to their disadvantage in wage determinations. It is also argued that wives who are married to high-income-earning husbands enjoy large income effects which allow them to work fewer hours than those married to low-income-earning husbands. The large income differential enables wives of high-income-earning husbands to reduce the number of hours of labour supply (Song 2007).

The evidence of a spousal wage penalty against women depends on several factors including their motherhood status and race (Budig & England 2001; Glauber 2007). It is argued that mothers may earn less than other women because having children causes them to lose job experience, become less productive at work, trade off higher wages for mother-friendly jobs, or become the subject of discrimination by employers. It is also argued that the relationship may be spurious rather than causal because women with lower earning potential may have children at relatively higher rates (Budig & England 2001; Budig & Hodges 2010; Gough & Noonan 2013). Unlike men, the literature on women is predominantly focused on the motherhood wage penalty which is an entirely different research area that falls outside the scope of this article because of the need to distinguish between married and single parents.

Spousal wages and hours of work

The literature on collective time use models indicate that Gronau (1973, 1977) and Becker (1965) had attempted to derive a time use model which focused on labour supply from the maximisation of a household utility function subject to budget and time constraints. However, none of them explicitly set up a theory of a multi-person scenario. Building on these weaknesses, Beblo (2001) formulated a multi-person case model of time allocation to labour supply and household production. The model which was reduced to a two-person (male-female) household explains how specialisation and division of work among couples is determined by their

comparative advantages in the competing time uses. The household was compared to a market where products are traded at prices that are determined by a partner's productivities in market work (measured by the wages) and household production.

The main conclusion of the model is that a higher male wage rate explains the well-known gender-specific division of work. Also, a wage differential in the labour market which takes the form of poor promotion prospects or lower pay for women contributes to specialisation even if the husband and the wife have equal levels of education. In addition, the childbearing ability of women and the complementarity between the bearing and rearing of children lead to a female comparative advantage in household activities. In an illustration of how partners' wages determine their time allocation to paid work, unpaid work and leisure in the two-person household scenario, Beblo (2001) postulated that men and women allocate their time to all three time uses according to the equality of the individual wage rate, marginal household productivity and the marginal rate of substitution between leisure and consumption when wages for men and women are equal.

However, if wages are not equal, specialisation equilibriums will take place where at least one of the partners chooses one or two of the following three scenarios of time use. When the woman's wage rate is equal to the marginal productivity of the household, but the man's wage rate exceeds the household marginal productivity, he will allocate his time to market work (paid work) and leisure and supply no housework. In that case, it is the woman who performs all principal time uses. When the woman's wage rate falls short of the household marginal productivity but the man's wage rate is equal to the marginal productivity of the household, the man does market work, non-market work and no housework while the woman specialises in household production and spends the rest of her time on leisure. This is because the wage rate that she could receive outside the household is too low for her to participate in the labour market. When the woman's wage rate falls short of the marginal productivity of the household, but the man's wage rate exceeds the household marginal productivity, the woman specialises in non-market work while the man specialises in market work (Beblo 2001).

A study in Australia shows that even if women's earnings reduce their own unpaid work, they do nothing to increase their husbands' unpaid work. Also, women's earnings only reduce their housework when they contribute less than half of the family income (Bittman et al. 2003). A similar study conducted in Spain confirmed that despite the decline in the gender wage gap, specialisation in home production continues to be high, with women providing most household produced goods and services. Although a woman's time spent on home production decreases as her wage increases, at higher wage levels the effect becomes less pronounced. Also, a woman's relative share of housework decreases as her relative wage increases, but only up to the point where she earns the same as her husband. A woman's time devoted to household activities, such as care where there are no credible alternatives, are less elastic to an increase in their relative wages (Fernandez & Sevilla-Sanz 2006).

Parera-Nicolau and Mumford (2005) found a negative effect of an increase in the hourly wage on the working hours of working mothers in the UK. Kimmel and Connelly (2007) found a substantial positive wage elasticity for caregiving time, while both leisure and home production time declined with increase wages in the US. These results support the findings of their earlier study which showed that the caregiving choice of mothers responds positively to higher wages just as hours of paid work. Connelly and Kimmel (2009) also observed that an increase in partners' wages was positively associated with women's primary care on all days, but negatively associated with their market work on weekdays in the US. While they found little evidence that men's time use responded to changes in their own wages, they concluded that increases in women's own wages increased their market work on weekdays. Also, increases in men's partners' wages increased men's passive childcare time on weekends and reduced their market-work time on weekends.

Gupta and Ash (2008) showed that in the US women's own earnings are negatively associated with their housework hours, independently of their partners' earnings and their shares of couples' total earnings. Increases in wives' relative wages in two-earner households enable them to enjoy significantly more leisure time (relaxing and watching television) and spend significantly less time doing chores, cooking and cleaning. It also enables wives to spend more time with family members while the reverse is true for husbands (Friedberg & Webb 2005). Argyrous and Rahman (2014) found that mothers in Australia perform a larger share of childcare, regardless of their earning power or their partner's availability to take on some of the tasks. This result corroborates findings of Bloemen and Stancanelli (2014) who noted that the wife's wage rate has a significant and positive effect on the husband's housework and childcare hours, but the wage rate of the father has a significantly negative effect on the mother's hours spent on paid work.

In the African context, the literature on the relationship between wage and intra-household time allocation remains limited. The few available studies have explored the impact of an array of non-wage related factors such as non-market income (Ranchhod & Wittenberg 2007), environmental degradation (Dimoso & Antonides 2008), and differences in time allocation to various household activities from the perspective of gender, age and geographical location (Arbache, Kolev & Filipiak 2010; Floro & King 2016). Others have also looked at the pattern of children's time allocation to labour and schooling (Bock 2002) and the effect of employment status on gender time allocation to paid work (Komatsu & Floro 2016).

From a Ghanaian perspective, there is no study on the relationship between intra-household time use and wage, although data on time use has been a component of the time use and employment module of all six rounds of the Ghana Living Standards Survey (GLSS) since 1987. As in the case of most African countries, the identified studies on time use have focused on a wide range of socio-economic factors but

none has considered the effect of wage. The issues covered are the impacts of infrastructure such as electricity and water on time use by men and women, determinants of domestic and market time use of children and the impact that these activities have on their school attendance (Costa et al. 2009; Coulombe & Wodon 2008; Morka 2015).

Methodology

The choice of the empirical estimation strategy was informed by the two theories (the working spouse premium or penalty theory and the labour supply theory) discussed in the preceding sections. The working spouse premium or penalty theory requires that the wife's (husband's) hours of work appear in the husband's (wife's) wage equation. The labour supply theory hypothesises that the husband's (wife's) wages affect the wife's (husband's) hours of work. Other important considerations are issues of endogeneity between hours of work and wages and the high proportion of zero observations for hours of work, which could be attributed in part to the data collection and generation process. We address these issues in order to obtain reliable estimates by specifying a model that simultaneously takes into account each partner's wage and hours of work, the endogeneity between hours of work and wage, and the censoring nature of the data. Following Hotchkiss and Moore (1999), Jacobsen and Rayack (1996) and Song (2007), this article employs the two-step instrumental variable (IV) Tobit estimation approach which has been described extensively by Maddala (1983) and Cameron and Trivedi (2005). The IV Tobit estimation technique addresses the issue of censoring which could bias the estimates and the potential endogeneity of hours of work and wages. This approach which involves simultaneous analysis of each partner's wage and hours of work also addresses the issue of interdependence between the two variables.

The first step in this estimation strategy involves the specification of a reduced-form equation for the husband's (wife's) wage using ordinary least squares (OLS). This equation contains all the exogenous variables that affect both wage and time use. It also contains the husband's (wife's) hours of work as an explanatory variable. Similarly, the reduced-form equation for the husband's (wife's) hours of work also contains the wife's (husband's) wage and is derived using a Tobit estimation approach. The second step involves the predicted values of wage and hours of work from the first-step estimations being used as instrument variables in place of the observed values of wage and hours of work. The wage equation is estimated by OLS and the equation for hours of work is estimated by a Tobit approach. In line with Cameron and Trivedi (2005), the bootstrap pairs procedure is used to correct the standard errors for the second-step estimates. The spousal wage and hours of work equations are specified as:

$$W_{it} = \gamma_{it} H_{it} + X_{it} \delta + \mu_{it} \quad [\text{Eqn 1}]$$

$$H_{it} = W_{it} \pi_w + Z_{it} \pi_z + v_{it} \quad [\text{Eqn 2}]$$

In Equation 1 and Equation 2, the variables H_{it} and W_{it} represent the vectors of paid and unpaid hours of work, and wages. The subscript i represents either the husband or the wife and the subscript t represents the time of the survey. The variables X_{it} and Z_{it} are the vectors of the exogenous variables that affect wage and hours of work. Although both X_{it} and Z_{it} contain some common variables, each contains variables that make it possible to identify the structural model. Z_{it} contains non-wage income (remittance used as a proxy) which affects hours of work but does not affect wage; X_{it} contains two variables (sector of employment and availability of a union at the workplace) that affect wage but not hours of work. From Equation 1 and Equation 2, the estimable equations for wages, paid and unpaid hours of work are respectively expressed as Equations 3, 4 and 5 with their a priori expectations:

$$\begin{aligned} Wage_{it} = & \alpha_0 + \alpha_1 Hrs_{it} + \alpha_2 Age_{it} + \alpha_3 Agesq_{it} + \alpha_4 Ethnic_{it} \\ & + \alpha_5 Edu_{it} + \alpha_6 Urban_{it} + \alpha_7 Union_{it} + \alpha_8 Sect_{it} + v_{it} \end{aligned} \quad [Eqn 3]$$

$$\alpha_1 > 0, \alpha_2 < 0, \alpha_3 > 0, \alpha_4 > 0 \text{ or } < 0, \alpha_5 > 0, \alpha_6 > 0, \alpha_7 > 0, \alpha_8 > 0 \text{ or } < 0$$

$$\begin{aligned} Hrs_{pit} = & \beta_0 + \beta_1 Wage_{it} + \beta_2 Wagesq_{it} + \beta_3 Rem_{it} \\ & + \beta_4 Age_{it} + \beta_5 Agesq_{it} + \beta_6 Ethnic_{it} + \beta_7 Edu_{it} \\ & + \beta_8 child_{it} + \beta_9 Urban_{it} + \gamma_{it} \end{aligned} \quad [Eqn 4]$$

$$\beta_1 > 0, \beta_2 < 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 > 0 \text{ or } < 0, \beta_7 > 0, \beta_8 < 0, \beta_9 > 0$$

$$\begin{aligned} Hrs_{hit} = & \delta_0 + \delta_1 Wage_{it} + \delta_2 Wagesq_{it} + \delta_3 Rem_{it} \\ & + \delta_4 Age_{it} + \delta_5 Agesq_{it} + \delta_6 Ethnic_{it} + \delta_7 Edu_{it} \\ & + \delta_8 child_{it} + \delta_9 Urban_{it} + \gamma_{it} \end{aligned} \quad [Eqn 5]$$

$$\delta_1 < 0, \delta_2 > 0, \delta_3 > 0, \delta_4 > 0, \delta_5 < 0, \delta_6 > 0 \text{ or } < 0, \delta_7 < 0, \delta_8 > 0, \delta_9 < 0$$

In Equation 4 and Equation 5, the subscripts p and h represent hours spent on paid and unpaid (household) work. Unpaid hours of work is an aggregated variable computed from hours spent on various household activities, including cooking, cleaning, shopping, collecting food from the garden, taking care of the sick and caring for children. Similarly, hours of paid work is an aggregated variable computed from hours engaged in primary and secondary occupations. Nominal wage was computed as the sum of the nominal income earned from main and secondary occupations while real wage was computed by dividing the nominal wage by the consumer price index (CPI). Also, wage had been captured in hourly, daily, weekly, monthly, quarterly and yearly units (Ghana Statistical Service 2014a). However, to ensure consistency between the time use indicators, all these units were converted into weeks. For policy purposes, the weekly wages were further computed on hourly bases by dividing the total wage receipts in a given period by the number of hours worked (Ghana Statistical Service 2014a). This means that the results are interpreted as hourly wages and weekly hours of work.

An earlier study by Song (2007) suggested a non-linear relationship between spousal wage and hours of work. The net effect of a further increase in wage depends on the dominance between the income and substitution effects and the perception of the individual regarding leisure. Given that leisure is a normal good, an increase in wage will induce the individual to spend more hours on paid work if the substitution effect outweighs the income effect (Ehrenberg & Smith 2016). Considering the feedback effect between labour supply and household production, the inverse of these hypotheses may hold for the effect of further wage increases on hours of unpaid work, holding other factors including sociocultural norms that affect gender roles in developing countries constant. The natural logs of both wage ($Wage$) and square of wage ($Wagesq$) are therefore included in the analysis to capture this non-linear relationship. Also included in the analysis is the natural log of remittance (Rem) which is used as an exclusion restriction in the equations for hours of work. Included as other control variables in both equations are age (Age), square of age ($Agesq$), ethnicity ($Ethnic$), education (Edu), the number of children under the age of 5 ($Child$) and place of residence or geographical location ($Urban$).

The normative expectation of the culture of ethnic groups shapes the distribution of decision-making power and access to resources. Ghana is made up of over 90 different ethnic groups with the Akan, Mole-Dagbani, Ewe and Ga-Dangme being the dominant ones. These different ethnic groups are characterised by a variety of kinship systems which influence gender equality in access to resources and power of decision-making in the household. Mainly residing in the southern part of Ghana, the Akan constitutes the largest ethnic group and is organised along matrilineal lines while most other ethnic groups, in the northern and eastern parts, are patrilineal. Among the ethnic groups, only the Ga ethnic groups are known to have somewhat anomalous bilateral inheritance and kinship structures (Baden et al. 1994). According to Baden et al. (1994) the matrilineal systems gives women greater access to resources outside marriage as opposed to patrilineal systems, but they offer little economic security to women. In this analysis, we recoded ethnicity which was captured by Ghana Statistical Service into eight categories: the Akan, Ga-Dangme, Ewe, Guan, Mole-Dagbani, Grusi, Gurma, and other minor ethnic groups in order to assess the effect of these ethnic affiliations on spousal wages and hour of work. Education has three main categories: (1) no education, (2) basic education (if a respondent completed primary or junior high school) and (3) secondary education plus (if a respondent completed at least senior high school). In the wage equation, two variables are included that capture the availability of unions at the workplace and sector of employment as exclusion restrictions. The inclusion of each of these variables is underpinned by theoretical and empirical findings.

Selection of instrument

Aside from the fact that the relationship between wage and hours of work could be endogenous due to simultaneity, omitted variable bias or misspecification and measurement

errors, the interaction between the husband and the wife regarding decision-making on labour market participation and home production suggests the presence of interdependence between spousal wage and hours of work. From this perspective, the couple's wages and hours of work could also be endogenous. Previous studies have addressed this potential endogeneity by using variables such as family non-wage income, education of the respondent, union status or membership, region of residence, and industry or sector of employment (Connelly & Kimmel 2009; Sedigh et al. 2016; Song 2007). Others have used pre-tax wage, the square of the pre-tax wage, capital income and the square of capital income (Bloemen & Stancanelli 2014; Daunfeldt & Hellström 2007).

In this study, education, sector of employment and availability of unions at the workplace were directly included in the regression for hours of work as potential instruments. However, the results of the Wald test of exogeneity (see Tables 5–8) showed that education was directly correlated with hours of work. Theoretical and empirical studies suggest that union organisation and membership significantly increase wages (Bryson 2007; Farber 2005). Evidence in Ghana and other countries such as Ivory Coast, India, Germany and Canada suggests that public sector workers enjoy a public sector wage premium (Baffour & Turkson 2015; Glinskaya & Lokshin 2007; Venti 1987; Younger & Osei-Assibey 2017). Moreover, both union membership and sector of employment have been used as instruments for wage in previous studies (Sedigh et al. 2016; Song 2007). The union variable is binary and takes on the value 1 if there is a trade union at the place where the respondent works and 0, otherwise. Likewise, the sector of employment variable is binary and takes on the value 1 if the respondent works in the public sector and 0 if they work in the private sector.

Sample design and data

The study relied on pooled data from the last three rounds of the GLSS (GLSS4, GLSS5 and GLSS6) conducted in 1998/1999, 2005/2006 and 2012/2013. Each covered a nationally representative sample of households interviewed over a period of 12 months and a variety of topics including the demographic characteristics of the population, education, health, employment and time use (Ghana Statistical Service 2000). The surveys used a two-stage stratified sampling design which involves the selection of enumeration areas (EAs) to represent the primary sampling units (PSUs) (see Ghana Statistical Service 2000, 2014a). These PSUs are allocated to the 10 regions using a probability proportional to population size (PPS). The EAs are further divided into urban and rural areas. This is followed by listing of households in the selected PSUs as the secondary sampling units (SSUs). At the second stage, households from each PSU are systematically selected to constitute the nationally representative sample (Ghana Statistical Service 2014a).

The GLSS4 used a sample of more than 5998 households, and over 25 000 persons (Ghana Statistical Service 2000). During the GLSS5, the sample was increased to 8687 households in 580 EAs, and 37 128 individuals. The sample sizes were

further increased to 16 772 households and 72 372 household members during the GLSS6 (Ghana Statistical Service 2014a). However, after the sample was restricted to only couples in the households where the husband and wife lived together, a pooled sample of 10 948 was arrived at, as presented in Table A1 in Appendix 1. As indicated in the introduction, the article considered couples in the same households so as to match the partners and enhance the analysis of intra-household interactions between couples.

Results and discussion

This section comprises two main sub-sections. The first sub-section analyses the empirical findings of spousal time allocation and wages (spousal premium or penalty) while the second sub-section presents and discusses the result on the analysis of the cross-wage effects of spousal labour supply and household production. The essence of this analysis was to examine the extent of interaction between time allocation and the wages of the wife and the husband. The estimates of both the OLS and two-step IV Tobit models are presented to compare the potential biases. However, given the observed downward biases of the OLS estimates, the IV estimates are interpreted. At the bottom of the output tables, the statistic and *p*-values of the Durbin-Wu-Hausman test of exogeneity are reported. The results show that, at the conventional levels of statistical significance, the OLS estimates are biased in a downward direction; hence the need to reject the hypothesis that the hours of work are exogenous in the wage equations.

Estimates of spousal wage premium or penalty

Table 1 and Table 2 present estimates of the effect of the wife's hours of paid and unpaid work and other control variables on the husband's hourly wage. Table 3 and Table 4 in turn present the effects of the husband's hours of paid and unpaid work on the wife's hourly wage equation. The estimates of the full sample models in Table 1 show evidence of a working spousal wage premium. Thus, an increase in the wife's hours of work significantly increases the husband's hourly wage. In a developing country like Ghana, wage and time allocation of men and women, married and unmarried differ due to factors including cultural values and social norms imbedded in ethnic practices, which influence the exercise of bargaining power and resource allocation in the household (Orkoh, Blaauw & Claassen 2020; Sayer 2005). These potential differences were explored in earlier studies by Hotchkiss and Moore (1999) and Song (2007) who found evidence of a premium or penalty in their sub-sample analyses based on the race or ethnicity of the respondent. Song, for instance, found a working spouse penalty among White husbands and a working spouse premium for Hispanic husbands, but the wife's hours of work had no effect on the wages of Black husbands in the US. In the current study, we test the consistency of the results by running a sub-sample analysis across ethnic groups using both paid and unpaid hours of work. The estimates of paid hours of work (see Table 2)

TABLE 1: Effect of the wife's hours of work on the husband's wage.

Dependent variable	Models for unpaid hours of work											
	Models for paid hours of work						Models for unpaid hours of work					
	Nominal wage			Real wage			Nominal wage			Real wage		
	OLS		IV Tobit		OLS		IV Tobit		OLS		IV Tobit	
	Coefficients	Robust standard errors	Marginal effects	Robust standard errors	Coefficients	Robust standard errors	Marginal effects	Robust standard errors	Coefficients	Robust standard errors	Marginal effects	Robust standard errors
Wife's weekly hours of work	0.001***	0.000	0.027***	-0.001	0.001***	0.000	0.026***	-0.001	-0.004***	0.000	-0.022***	-0.001
Husband's age	0.003**	-0.002	0.039***	-0.004	0.004**	-0.002	0.038***	-0.004	0.004**	-0.002	0.008**	-0.003
Husband's age square	0.000	0.000	-0.000***	0.000	0.000	0.000	-0.000***	0.000	0.000	0.000	0.000	0.000
Gender	0.029	-0.027	-0.043	-0.028	0.009	-0.027	-0.060**	-0.024	0.017	-0.027	-0.049*	-0.026
Ewe	0.047**	-0.024	-0.015	-0.022	0.035	-0.024	-0.024	-0.023	0.03	-0.024	-0.057**	-0.023
Guan	-0.096***	-0.026	-0.063**	-0.028	-0.104***	-0.025	-0.074***	-0.027	-0.094***	-0.026	-0.076***	-0.022
Mole-Dagbani	-0.037**	-0.017	-0.103***	-0.016	-0.036**	-0.018	-0.105***	-0.018	-0.031*	-0.017	-0.004	-0.017
Grusi	-0.069**	-0.03	-0.062**	-0.028	-0.067**	-0.03	-0.061**	-0.029	-0.074**	-0.029	-0.085***	-0.024
Gurma	-0.083***	-0.021	-0.271***	-0.022	-0.085***	-0.02	-0.264***	-0.025	-0.076***	-0.02	-0.061***	-0.023
Other ethnic	-0.090***	-0.032	-0.062*	-0.032	-0.086***	-0.032	-0.059*	-0.033	-0.070**	-0.032	0.004	-0.028
Basic education	0.015	-0.014	0.031**	-0.014	0.004	-0.014	0.040***	-0.012	0.009	-0.014	0.025**	-0.014
Secondary education plus	0.062**	-0.027	0.032**	-0.025	0.041**	-0.027	0.013	-0.024	0.049*	-0.027	0.026**	-0.028
Urban	0.259***	-0.017	0.168***	-0.016	0.264***	-0.017	0.176***	-0.015	0.247***	-0.016	0.166***	-0.015
Union at workplace	0.524***	-0.027	0.508***	-0.025	0.464***	-0.027	0.450***	-0.02	0.515***	-0.026	0.528***	-0.027
Sector of employment	0.067***	-0.018	0.312***	-0.02	0.062***	-0.018	0.295***	-0.018	0.099***	-0.017	0.293***	-0.019
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Constant	0.886***	-0.046	-	-	0.892***	-0.046	-	-	1.115***	-0.049	-	-
Observations	10 489	-	10 453	-	10 489	-	10 453	-	10 489	-	10 453	-
R-squared	0.15	-	-	-	0.132	-	-	-	0.171	-	-	-
Durbin-Wu-Hausman test	-	-	0.001**	-	-	-	0.001***	-	-	-	0.022***	-
Wald test of exogeneity (p-values)	-	-	-0.0003	-	-	-	-0.001	-	-	-	0.002	-

OLS, ordinary least squares; IV, instrumental variable.
 * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

TABLE 2: Instrumental variable estimates of the wife's hours of work and the husband's wage by ethnic affiliation.

Dependent variable Husband's logged wage: Ghana Cedis	Akan		Ga-Dangme		Ewe		Guan		Mole-Dagbani		Grusi		Gurma		Other ethnic	
	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error
Wife's paid hours (Nominal)	0.020***	0.001	0.021***	0.002	0.023***	0.002	0.011***	0.002	0.008***	0.001	0.011***	0.004	0.005*	0.002	0.013***	0.004
Wife's paid hours (Real)	0.019***	0.001	0.020***	0.003	0.022***	0.002	0.009***	0.002	0.008***	0.001	0.010***	0.003	0.005**	0.002	0.012***	0.003
Wife's unpaid hours (Nominal)	-0.020***	0.001	-0.020***	0.002	-0.016***	0.002	-0.008***	0.002	-0.006***	0.001	-0.006***	0.002	-0.004**	0.001	-0.013***	0.003
Wife's unpaid hours (Real)	-0.021***	0.001	-0.022***	0.002	-0.017***	0.002	-0.009***	0.002	-0.007***	0.001	-0.008***	0.002	-0.005***	0.002	-0.013***	0.003
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Observations	4421	-	837	-	1253	-	486	-	2216	-	362	-	476	-	402	-

*, $p < 0.1$; **, $p < 0.05$; ***, $p < 0.01$.

TABLE 3: The effect of the husband's hours of work on the wife's wage.

Dependent variable: Wife's logged wage: Ghana Cedis	Models for hours of paid work						Models for hours of unpaid work					
	Nominal wage			Real wage			Nominal wage			Real wage		
	OLS		IV Tobit	OLS		IV Tobit	OLS		IV Tobit	OLS		IV Tobit
	Coefficients	Robust standard error	Marginal effects	Coefficients	Robust standard error	Marginal effects	Coefficients	Robust standard error	Marginal effects	Coefficients	Robust standard error	Marginal effects
Husband's hours	0.0003**	0.0001	0.0115***	0.0009	0.0000	0.0004**	0.0002	0.0004***	0.0001	0.0022***	0.0008	0.0012***
Wife's age	0.0025***	0.0009	0.0022*	0.0012	0.0008***	0.0006***	0.0001	0.0024***	0.0009	0.0031***	0.0009	0.0010***
Wife's age square	-0.0000***	0.0000	-0.0001***	0.0000	-0.0000***	0.0000	-0.0000***	0.0000	-0.0000***	0.0000	-0.0000***	0.0000
Ga-Dangme	0.0124	0.0154	-0.0107	0.0152	0.0019	0.0010	0.0028	0.0127	0.0154	0.0153	0.0142	0.0018
Ewe	0.0153	0.0130	0.0061	0.0137	-0.0006	-0.0011	0.0022	0.0150	0.0130	0.0189	0.0142	-0.0006
Guan	-0.0139	0.0142	-0.0073	0.0133	0.0015	0.0055	0.0057	-0.0142	0.0142	-0.0134	0.0140	0.0015
Mole-Dagbani	0.0157*	0.0092	0.0043	0.0085	-0.0011	0.0016	0.0016	0.0163*	0.0092	0.0144	0.0091	-0.0011
Grusi	-0.0084	0.0128	0.0184	0.0125	-0.0039**	0.0018	-0.0027	-0.0084	0.0128	-0.0128	0.0116	-0.0038**
Gurma	-0.0085	0.0075	-0.0351***	0.0079	-0.0003	0.0019	0.0019	-0.0080	0.0075	-0.0081	0.0077	-0.0004
Other ethnic	-0.0464***	0.0098	-0.0381***	0.0088	-0.0006	0.0035	-0.0007	-0.0457***	0.0098	-0.0496***	0.0101	-0.0006
Basic education	0.0142*	0.0073	0.0057	0.0059	0.0016	0.0017	0.0013	0.0145**	0.0073	0.0139*	0.0072	0.0016
Secondary education plus	0.0156	0.0150	0.0201	0.0143	0.0019	0.0023	0.0037	0.0155	0.0150	0.0156	0.0153	0.0020
Urban	0.0801***	0.0085	0.0466***	0.0069	-0.0012	-0.0027	0.0019	0.0806***	0.0085	0.0831***	0.0077	-0.0013
Urban at workplace	0.1508***	0.0147	0.1476***	0.0134	0.0259***	0.0037	0.0252***	0.1528***	0.0146	0.1524***	0.0120	0.0252***
Sector of employment	0.0753***	0.0092	0.1407***	0.0124	0.0101***	0.0019	0.0128***	0.0729***	0.0091	0.0785***	0.0097	0.0104***
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Constant	0.6085***	0.0209	-	-	0.6770***	-	-	0.6315***	0.0198	-	-	0.6749***
Observations	10 489	-	10 453	-	10 489	-	10 453	-	10 489	-	10 453	-
R-squared	0.0643	-	-	-	0.0271	-	-	0.0218	-	-	-	0.0031
Durbin-Wu-Hausman test	-	-	-0.0002***	-	-	-	-0.0001**	-	-	-	-	-0.0004***
Wald test of exogeneity (p-values)	-	-	(0.0002)	-	-	-	(0.00003)	-	-	-	-	(0.0002)

OLS, ordinary least squares; IV, instrumental variable.

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

TABLE 4: Instrumental variable estimates of the husband's hours of work and the wife's wage by ethnic affiliation.

Dependent variable Wife's logged wage: Ghana Cedis	Akan		Ga-Dangme		Ewe		Guan		Mole- Dagbani		Grusi		Gurma		Other ethnic	
	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error
Husband's paid hours (nominal)	0.008***	0.001	0.007***	0.002	0.007***	0.002	0.007***	0.002	0.002**	0.001	0.002	0.002	-0.000	0.001	0.002	(0.001)
Husband's paid hours (Real)	0.033***	0.002	0.029***	0.005	0.037***	0.004	0.018***	0.005	0.015***	0.002	0.014***	0.003	0.007**	0.003	0.025***	(0.005)
Husband's unpaid hours (nominal)	-0.006***	0.001	-0.005*	0.003	-0.003	0.003	-0.008	0.005	-0.005***	0.001	-0.006	0.004	0.000	0.001	-0.002	(0.002)
Husband's unpaid hours (Real)	-0.030***	0.002	-0.028***	0.005	-0.023***	0.006	-0.012**	0.005	-0.023***	0.002	-0.021***	0.007	-0.015***	0.004	-0.018***	(0.005)
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Observations	4421	-	837	-	1253	-	486	-	2216	-	362	-	476	-	402	-

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

suggest evidence of a working spouse premium for the husband regardless of the ethnic affiliation. Evidence of this spousal premium is confirmed by the negative relationship between hours of unpaid work and a husband's hourly wage. These results support the selection thesis that men in Ghana who are already on a steep career track are more likely to marry and, in fact, marry women who are equally employed (Barg & Beblo 2007; Ludwig & Brüderl 2018).

In addition to the wife's hours of paid and unpaid work, the husband's own age has a non-linear relationship with his hourly wage. The hourly wage first increases with an increase in age and then becomes negative after a certain age threshold. As a person ages and gain more experience at work, they are more likely to receive higher wages. However, after a certain age (mostly after the retirement age threshold), age tends to have less effect on wages due to factors including poor health, or occupational immobility which in turn can result from technological advancement. Unlike for the within group analysis, results with ethnicity as a control variable (see Table 1) indicate that keeping the Akan ethnic group, which constitutes the majority (47.5%) of the ethnic groups in Ghana, as the reference category, the results show that wage decreases for a husband who is affiliated with the Ga, Guan, Ewe, Mole-Dagbani, Grusi and other ethnic groups. These differences in the effect of ethnicity on the spousal wage could be explained by ethnic practices that determine women's access to resources. Compared to the Akan ethnic group, which is organised on a matrilineal system, almost all of these ethnic groups are organised on a patrilineal system which does not give greater access to resources outside marriage (Baden et al. 1994).

The estimates of education confirm the expected positive association with wages. Geographical location (settlement) remains one of the factors that directly determine households' access to social services and engagement in economic activities and indirectly affects their time allocation decision and earnings. This analysis shows that a husband in an urban area earns higher wages than his counterparts in the rural areas. Consistent with the a priori expectation, the availability of a union in the workplace has a positive influence on the husband's wage. In summary, this analysis has shown evidence of a working spouse wage premium for men in Ghana regardless of their ethnic affiliation or level of education.

The models in Table 3 indicate a positive association between the husband's labour supply and the wife's wage. The magnitude of the coefficients, however, is smaller than those revealed in the models for the husband's wage. Contrary to the results in the husband's wage equations, there is a positive association between the husband's hours of household production and the wife's wage. However, across ethnic affiliation (see Table 4), the results show that an increase in the husband's hours of unpaid work is negatively associated with the wife's wages. This negative association could mean that when men increase their hours of household

production, women do not necessarily channel their free hours into market labour but rather into leisure. This in turn could be explained by either personal preference, labour market conditions that do not favour women, social norms imbedded in ethnic practices or a combination of any of the three factors.

These results suggest that the differences in spousal time allocation to household production and labour supply affect spousal wages of couples in Ghanaian households differently. The observed positive association between spousal hours of labour supply and wages lends support to the findings of Jacobsen and Rayack (1996) who observed a working spouse wage premium. Thus, married men (wives) whose wives (husbands) are gainfully employed earn higher wages than their counterparts who have non-working wives (husbands). The key explanations for these results could be: (1) the complementarity in the market production of the couples, (2) that men who are highly productive tend to marry women who are also highly productive in the labour market through assortative mating, and (3) that additional income from the working wife (husband) may allow the husband (wife) to pursue well-paying job opportunities.

Regarding the other correlates in the full models (see Table 3), the age of the wife also shows the same non-linear relationship with her hourly wage. With the Akan ethnic group as the reference category, wage increases for a woman who is affiliated with the Mole-Dagbani ethnic group but increases for a woman who is affiliated with the Gurma and other ethnic groups. The results for ethnicity as a control variable show weaker evidence among wives compared to those found in the models for the husbands. In all the models, education and urban residence are positively associated with the wife's wage. These findings give some idea of the gender inequality that exists in terms of access to the formal labour market and wages in Ghana, which is largely influenced by decisions regarding the division of labour between couples in the household. On average, men in Ghana have greater access to wage employment while women are more likely to be engaged in self-employment and informal market activities (Ghana Statistical Service 2014b).

This phenomenon is influenced by several factors, including but not limited to gender disparity in education, especially at the higher level, and the limited availability of flexible work conditions (e.g. early childhood education in public schools, onsite day care services and efficient transport systems) in the labour market which make it difficult for women to balance parenting with work. For instance, the gender parity index (GPI) increased marginally from 0.960% in 2005 to 1.01 in 2019 while the gross enrolment rate (GER) in tertiary education for women increased from 4.20% to 15.80% within the same period (World Bank, 2020). Across geographical location (see Table 3), the analysis shows that a woman in an urban area earns a higher wage than her counterpart in the rural areas. Also, availability of a union in the workplace and

employment in the public sector have significantly positive influences on the wages of the wife.

Cross-wage effect of spousal time allocation

This section discusses the results on the spousal wages and hours of paid work in Table 5 and Table 6 and the results for wages and hours of unpaid work in Table 7 and Table 8. The essence of this analysis is to explore the feedback effects of labour market outcomes on intra-household hours of work. Like the analysis of spousal wage premium or penalty, only the IV Tobit estimates are interpreted because of the downward biasness of the Tobit estimates.

Spousal wages and hours of paid work

The results in Table 5 show a non-linear relationship between the hourly wage of the husband's and the wife's labour supply. Thus, the cross-wage effect of the husband's hourly wage on the wife's weekly hours of paid work is first positive and then becomes negative after a certain wage threshold. The turning point (see bottom of the output tables) shows that at wages below these thresholds, a wife whose husband earns a higher wage spends fewer hours on paid work than a wife whose husband earns a comparatively lower wage. In monetary terms, the turning points in the Tobit and IV Tobit estimates for the nominal wage (columns 2 and 3 of Table 5) translate into approximately GHC12 and GHC13. Similarly, the turning points for real wage (columns 5 and 6) translate into approximately GHC38 and GHC42.

Considering the other correlates of the wife's hours of paid work, age has a non-linear relationship with work hours. The wife's hours increase with an increase in her age up to a certain point and then begin to decrease. Compared with a wife who has no education, a wife who has acquired a higher level of education will spend more hours on paid work and fewer hours on unpaid work. It is furthermore observed that the number of children under the age of 5 in the household, ethnic affiliation and geographical location of the wife have significant effects on her hours of work. Compared with a wife who belongs to the Akan ethnic group, her counterparts affiliated with the Ga-Dangme, Ewe, Mole-Dagbani, or Gurma ethnic groups will spend fewer hours on household production. A wife who lives in an urban area will spend significantly fewer hours on household production but more hours on paid work.

Similar to that of the wife, the husband's labour supply models in Table 6 show a non-linear relationship with his hourly wage. The point at which a further increase in nominal hourly wage is associated with a reduction in hours of paid work (columns 2 and 3) is equivalent to GHC12. The corresponding values for the real wage (columns 5 and 6) are GHC25 and GHC28. It is obvious from the values of the turning points for the real wage that the husband's hours of paid work are more responsive to further changes in the wife's. The magnitude of the increase in the husband's hours

TABLE 5: The husband's hourly wage and the wife's hours of paid work.

Dependent variable Wife's weekly hours of paid work	Nominal wage (Ghana Cedis)						Real wage (Ghana Cedis)					
	Tobit		Instrumental variable Tobit		Tobit		Instrumental variable Tobit		Tobit		Instrumental variable Tobit	
	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error
Husband's logged hourly wage	2.466***	0.926	11.678***	1.653	11.606***	1.817	2.593***	0.978	9.106***	1.538	9.258***	1.935
Husband's logged hourly wage square	-0.314	0.204	-2.354***	0.673	-2.300***	0.718	-0.337	0.213	-1.248*	0.660	-1.236	0.758
Logged remittance	-0.028	0.088	-0.018	0.086	-0.026	0.080	-0.027	0.088	-0.011	0.081	-0.019	0.098
Wife's age	1.538***	0.084	1.487***	0.087	1.489***	0.096	1.540***	0.084	1.493***	0.083	1.495***	0.084
Wife's age square	-0.018***	0.001	-0.017***	0.001	-0.017***	0.001	-0.018***	0.001	-0.017***	0.001	-0.017***	0.001
Ga-Dangme	1.217*	0.709	1.123	0.720	1.100	0.725	1.250*	0.709	1.241*	0.743	1.214*	0.697
Ewe	1.360**	0.603	1.003	0.635	1.042	0.648	1.380**	0.604	1.099*	0.635	1.134*	0.590
Guan	-0.466	0.889	0.067	0.850	0.232	0.911	-0.447	0.889	0.069	0.914	0.267	0.905
Mole-Dagbani	2.723***	0.472	2.876***	0.516	3.082***	0.443	2.722***	0.472	2.836***	0.499	3.060***	0.561
Grusi	0.643	1.013	0.856	1.119	1.129	0.976	0.645	1.013	0.765	1.069	1.070	0.918
Gurma	5.713***	0.730	6.309***	0.690	6.533***	0.682	5.714***	0.729	6.234***	0.735	6.485***	0.813
Other ethnic	-0.126	1.016	0.197	1.088	0.388	1.145	-0.128	1.017	0.135	1.026	0.353	1.011
Basic education	1.549***	0.381	-	-	1.114***	0.402	1.561***	0.381	-	-	1.178***	0.362
Secondary education plus	0.371	0.672	-	-	-0.322	0.662	0.398	0.672	-	-	-0.291	0.688
Children under 5	-0.006	0.035	-	-	-0.091**	0.036	-0.010	0.035	-	-	-0.105***	0.039
Urban	1.870***	0.406	-	-	0.226	0.438	1.864***	0.407	-	-	0.149	0.422
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Observations	10 489	-	10 453	-	10 453	-	10 489	-	10 489	-	10 453	-
Turning point in husband's logged wage	3.984	-	2.485	-	2.524	-	3.809	-	3.644	-	3.734	-
Wald test of exogeneity (p-values)	-	-	0.159	-	0.148	-	-	-	0.162	-	0.157	-

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

TABLE 6: The wife's hourly wage and the husband's hours of paid work.

Dependent variable Husband's weekly paid hours	Nominal wage (Ghana Cedis)				Real wage (Ghana Cedis)			
	Tobit		Instrumental variable Tobit		Tobit		Instrumental variable Tobit	
	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error
Wife's logged wage	3.298*	1.685	16.171**	2.110	-11.026	7.614	12.898***	1.811
Wife's logged wage square	-0.532	0.360	-3.291***	0.789	2.147	1.759	-1.996***	0.722
Remittance	-0.238**	0.097	-0.226**	0.107	-0.240**	0.097	-0.215**	0.093
Husband's age	0.140	0.140	0.092	0.123	0.149	0.141	0.103	0.119
Husband's age square	-0.004**	0.001	-0.003**	0.001	-0.004**	0.001	-0.003**	0.001
Ga-Dangme	1.651**	0.754	1.407*	0.741	1.699**	0.755	1.575**	0.780
Ewe	0.667	0.634	0.092	0.569	0.697	0.634	0.229	0.650
Guan	-0.338	0.962	0.677	0.941	-0.358	0.963	0.655	0.924
Mole-Dagbani	1.613***	0.526	2.126***	0.588	1.597***	0.526	2.051***	0.451
Grusi	-1.069	1.155	-0.291	1.142	-1.120	1.156	-0.436	1.185
Gurma	2.935***	0.770	4.153***	0.817	2.859***	0.770	4.018***	0.714
Other ethnic	-0.199	1.085	0.544	0.975	-0.243	1.084	0.444	1.116
Basic education	1.238***	0.410	-	-	1.235***	0.410	-	-
Secondary education plus	0.019	0.731	-	-	0.020	0.732	-	-
Children under 5	0.057	0.037	-	-	0.059	0.037	-	-
Urban	2.573***	0.443	-	-	2.720***	0.439	-	-
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-
Observations	10 489	-	10 453	-	10 489	-	10 453	-
Turning point in husband's logged wage	3.113	-	2.458	-	-	-	3.231	-
Wald test of exogeneity (p-values)	-	-	0.258	-	-	-	0.287	-

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

TABLE 7: The husband's logged hourly wage and the wife's hours of unpaid work.

Dependent variable Wife's weekly hours of unpaid hours	Nominal wage (Ghana Cedis)						Real wage (Ghana Cedis)					
	Tobit		Instrumental variable Tobit		Tobit		Instrumental variable Tobit		Tobit		Instrumental variable Tobit	
	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error	Marginal effects	Standard error
Husband's logged hourly wage	-6.528***	0.627	-32.706***	1.751	-31.637***	1.705	-7.177***	0.592	-34.038***	1.801	-33.334***	2.123
Husband's logged hourly wage square	0.624***	0.131	7.897***	0.625	7.471***	0.612	0.760***	0.124	8.193***	0.718	7.748***	0.791
Logged remittance	0.055	0.084	0.053	0.084	0.038	0.085	0.054	0.084	0.031	0.080	0.013	0.076
Wife's age	0.392***	0.110	0.528***	0.109	0.516***	0.108	0.387***	0.110	0.529***	0.106	0.518***	0.114
Wife's age square	-0.009***	0.001	-0.011***	0.001	-0.011***	0.001	-0.009***	0.001	-0.011***	0.001	-0.011***	0.001
Ga-Dangme	-2.471***	0.762	-2.247***	0.829	-2.275***	0.742	-2.569***	0.763	-2.542***	0.764	-2.555***	0.742
Ewe	-3.157***	0.594	-2.619***	0.631	-2.548***	0.578	-3.217***	0.595	-2.777***	0.662	-2.686***	0.477
Guan	0.456	0.952	-1.374	0.885	-1.118	0.871	0.401	0.952	-1.621*	0.926	-1.446*	0.854
Mole-Dagbani	-0.451	0.497	-1.300***	0.496	-1.172**	0.494	-0.447	0.497	-1.338***	0.476	-1.210***	0.418
Grusi	-1.940*	1.028	-3.281***	0.994	-3.174***	1.004	-1.942*	1.027	-3.302***	0.952	-3.230***	1.006
Gurma	-1.839**	0.824	-3.824***	0.767	-3.612***	0.803	-1.841**	0.824	-4.039***	0.768	-3.824***	0.839
Other ethnic	3.102***	1.139	1.341	1.107	1.343	1.029	3.109***	1.138	1.362	1.061	1.310	1.074
Basic education	-2.242***	0.402	-	-	-1.133***	0.435	-2.277***	0.402	-	-	-1.118***	0.423
Secondary education plus	-2.598***	0.698	-	-	-1.116	0.702	-2.678***	0.697	-	-	-1.035	0.704
Children under 5	0.340***	0.035	-	-	0.171***	0.040	0.329***	0.035	-	-	0.109***	0.035
Urban	-2.387***	0.424	-	-	0.815*	0.475	-2.371***	0.424	-	-	1.332***	0.422
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Observations	10 489	-	10 453	-	10 453	-	10 489	-	10 453	-	10 453	-
Turning point in husband's logged wage	5.266	-	2.070	-	2.118	-	4.723	-	2.078	-	2.150	-
Wald test of exogeneity (p-value)	-	-	0.231	-	0.245	-	-	-	0.257	-	0.325	-

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

TABLE 8: The wife's logged hourly wage and the husband's hours of unpaid work.
Husband's weekly unpaid hours

	Dependent variable											
	Nominal wage (Ghana Cedis)				Real wage (Ghana Cedis)				Tobit			
	Marginal effects	Standard error	Instrumental variable	Tobit	Marginal effects	Standard error	Instrumental variable	Tobit	Marginal effects	Standard error	Instrumental variable	Tobit
Wife's logged hourly wage	-0.685**	0.343	-1.591**	0.693	-1.278*	0.704	-3.082***	0.650	-2.674	2.140	-2.832***	0.732
Wife's logged hourly wage square	0.107	0.072	0.260	0.250	0.211	0.240	0.776***	0.248	0.665	0.538	0.726***	0.262
Remittance	-0.072**	0.030	-0.075**	0.030	-0.074**	0.029	-0.073***	0.028	-0.072**	0.030	0.071**	0.028
Husband's age	0.152***	0.026	0.146***	0.029	0.150***	0.028	0.147***	0.029	0.152***	0.026	0.151***	0.029
Husband's age square	-0.001***	0.000	-0.001***	0.000	-0.001***	0.000	-0.001***	0.000	-0.001***	0.000	-0.001***	0.000
Ga-Dangme	-0.530*	0.280	-0.481*	0.249	-0.497*	0.264	-0.500*	0.303	-0.528*	0.280	-0.511*	0.277
Ewe	-0.679***	0.224	-0.684***	0.220	-0.686***	0.244	-0.678***	0.223	-0.681***	0.224	-0.674***	0.213
Guan	-0.072	0.342	-0.270	0.346	-0.176	0.313	-0.345	0.383	-0.068	0.342	-0.256	0.331
Mole-Dagbani	0.618***	0.172	0.500***	0.174	0.558***	0.171	0.465***	0.158	0.617***	0.172	0.533***	0.177
Grusi	1.045**	0.454	0.885**	0.436	0.983**	0.467	0.829*	0.424	1.047**	0.454	0.933**	0.454
Gurma	0.374	0.292	0.182	0.292	0.253	0.278	0.086	0.275	0.382	0.292	0.170	0.313
Other ethnic	1.205**	0.499	1.081**	0.450	1.160**	0.460	1.047**	0.480	1.219**	0.498	1.123**	0.505
Basic education	0.143	0.151	-	-	0.191	0.152	-	-	0.140	0.151	0.231	0.146
Secondary education	-0.111	0.252	-	-	-0.018	0.239	-	-	-0.117	0.252	0.031	0.239
Children under 5	0.069***	0.013	-	-	0.060***	0.013	-	-	0.070***	0.013	0.050***	0.013
Urban	-0.371**	0.156	-	-	-0.161	0.200	-	-	-0.393**	0.153	-0.034	0.210
Year fixed effects	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
Observations	10 489	-	10 453	-	10 453	-	10 453	-	10 489	-	10 453	-
Turning point in husband's logged wage	-	-	-	-	-	-	-	-	-	-	-	-
Wald test of exogeneity (p-values)	-	-	0.176	-	0.1925	-	0.186	-	-	-	0.1988	-

***, $p < 0.01$; **, $p < 0.05$; *, $p < 0.1$.

of paid work due to an increase in the wife's hourly wage is within a range of 13 h to 16 h per week, while that of the wife is between 9 h and 11 h per week. These results reflect the unequal gender opportunities in the labour market and male dominance in household decision-making in a culturally conservative Ghanaian society, regardless of the economic status of a woman.

Although remittances have an insignificant effect on the wife's hours of labour supply, it significantly reduces the husband's hours of paid work. The observed negative effect of remittances on hours of work confirms the findings of earlier studies (Adams & Cuecuecha 2013; Ilahi 2000). Across ethnic groups, time spent on paid work is on average, significantly higher among husbands affiliated with the Ga-Dangme, Mole-Dagbani or Gurma ethnic groups than a husband from the Akan ethnic group. These results highlight the need for policies on gender equality in the household and in the labour market to consider ethnic diversity and cultural practices that influence men and women's time allocation to labour supply and home production. The results also indicate a positive association between education and hours of paid work. Thus, husbands who have completed at least some basic education spend more time on paid work than their counterparts who have no level of education. Compared with the estimates in the models for the wife's hours of work, one can conclude that education has a relative larger impact on women's hours of work than those of men. As observed in the models for the wife's hours of work, the number of children under the age of 5 in the household reduces the husband's hours of labour supply. Across geographical locations, the estimates of the hours of labour supply do not show any significant difference between husbands in the urban areas and those in the rural areas.

Spousal wages and hours of unpaid work

In Table 7 and Table 8, the relationship between spousal wages and hours of unpaid work is not monotonic. The relationship between the husband's hourly wage and the wife's weekly hours of unpaid work is first negative and then becomes positive after an indicated wage threshold in the tables. The implication is that above the wage levels determined by the turning points, the wife will reduce her hours of labour supply and increase her hours of household production. Further increase in the husband's hourly wage above the threshold will reduce the wife's hours of unpaid work by not less than 32 h per week. It can be inferred from the results that an increase in the husband's hourly wage enables the household to hire others to assist them with household duties. This relieves the wife of some hours of household responsibilities which she could channel into paid activities or leisure.

In addition to wages, other control variables that significantly affect the wife's hours of unpaid work are ethnicity, education, presence of a child under 5 years of age in the household and geographical location. Apart from the other minor ethnic

groups, a woman from the Ga-Dangme, Mole-Dagbani, Ewe Guan, Grusi or Gurma ethnic groups spends fewer hours on unpaid work than her counterpart from the Akan ethnic group. While a similar negative association is observed for education and urban residence, the presence of a child under 5 years of age is positively associated with the wife's hours of unpaid work. As observed in Table 8, the nature of the relationship between the wife's wage and the husband's hours of unpaid work is similar to those of the wife. However, the reduction in the husband's hours of unpaid work due to an increase in the wife's hourly wage is lower (2–3 h per week) than the 32 h per week for the wife. Thus, changes in the husband's wages have a bigger impact on household production than those of the wife's.

Apart from ethnicity, all the other control variables show a similar relationship with the husband's unpaid hours of work as observed in the models for the wife. For instance, remittances and urban residence significantly reduce the husband's hours of unpaid work while the presence of a child under 5 years of age increases the husband's hours of unpaid work. However, ethnic affiliation shows some heterogeneities. Compared with a husband from the Akan ethnic group, a husband who is affiliated with the Mole-Dagbani, Grusi or other ethnic groups spends more hours on unpaid work, but a husband from the Ga-Dangme and Ewe ethnic groups spends fewer hours on household production. It can be inferred from these differential effects of ethnic affiliation on hours of work that ethnic practices and ethnic-related social norms largely shape intra-household decisions on labour force participation, labour supply, and household production. On the basis of these results, policies on gender equality in the household and in the labour market would give due cognisance to ethnic diversity and cultural practices that could affect the success of such policies.

Conclusion

Studies on the sources (specialisation, selection and productivity) of spousal wage premiums and penalties have been conducted mainly in developed countries, with very limited evidence from developing countries, where social norms influence gender roles and intra-household resource allocation. This article has contributed to filling the research gap on the spousal effect of wages and time allocation from a developing country perspective. It specifically contributes to the limited literature on female aspects of the spousal wage premium or penalty and the interrelationship between labour market outcomes and household production in Ghana. The estimates of the two-step IV Tobit showed elements of a working spouse wage premium (due to positive selection rather than specialisation) regardless of the gender and ethnic affiliation of the respondent. The wife's hours of paid (unpaid) work have positive (negative) effects on the husband's wage, while the husband's paid and unpaid hours increase the wife's wage. The analysis of the effect of wage on spousal hours of work also suggested complementarity in employment and household labour decisions between couples. Thus, men's and women's participation in household production significantly

improves each other's labour market participation and labour supply. These results corroborate the findings of some of the extant studies, which found evidence of a wage premium mainly for men (Groothuis & Gabriel 2010; Hill 1979; Song 2007; Strike 2012).

These results suggest that labour market policies such as paternity leave, which would encourage men's (husbands') active participation in household production, would go a long way in enhancing women's (wives') labour force participation and earnings. The article recommends that government and labour unions should step up their efforts to expand the coverage of the current five working days' paternity leave that covers only health service, education and mining sector workers (Otoo, Osei-Boateng & Adjaye 2009) to include all workers in the formal sector as this would indirectly improve women's wages in the household. Furthermore, policies aimed at minimising gender inequality in terms of opportunities in the labour market will play a critical role in ensuring a more equitable response of men's and women's hours of market production to changes in wage rates. While this study provides concrete basis for gender mainstreaming in labour market policies and intra-household resources allocation, it relied on pooled data which makes it difficult to track the dynamics of intra-household wages and hours of work over time. Future studies should consider using a panel data approach that would allow for the analysis of changes in spousal wages and hours of work overtime.

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Authors' contributions

C.C. worked on the introduction and contributed to the review of the literature; P.F.B. contributed to the literature review and discussion of the results; E.O. did the data management and contributed to the discussion of the results and conclusions. In essence, the workload was equally shared among the authors of the article.

Ethical consideration

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Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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Appendix 1

Activities performed by individuals and variables included in the models

TABLE 1-A1: Observations for activities performed by individuals 15 years and older.

Number	Variable (work activities)	Observation		
		GLSS4: 1998/1999	GLSS5: 2005/2006	GLSS6: 2012/2013
Unpaid work				
1	Collecting firewood	4137	21 249	42 517
2	Fetching water	6259	21 107	42 519
3	Ironing	3819	21 296	42 518
4	Taking care of children	4879	21 184	42 486
5	Cooking	7345	21 141	42 518
6	Running errands	5196	21 228	42 518
7	Shopping	5844	21 251	42 519
8	Washing	5524	-	-
9	Washing vehicle	134	-	-
10	Washing dishes and pots	-	21 359	42 517
11	Washing clothes	-	21 346	42 521
12	Sweeping	7296	-	-
13	Disposing of garbage	3886	-	-
14	Cleaning	-	21 223	42 514
15	Others	7928	21 216	-
16	Taking care of the elderly	-	21 230	42 495
17	Taking care of the sick	-	21 339	42 496
18	Helping children with schoolwork	-	-	42 480
19	Collecting food from garden	-	-	42 494
Paid work				
1	Primary work	2595	14 593	30 973
2	Secondary work	2794	2537	4857
3	Third work	226	-	-
4	Fourth work	19	-	-

GLSS, Ghana Living Standards Survey.

TABLE 2-A1: Descriptive statistics of the variables of interest.

Variable	Observation	Mean	Standard deviation
Husband's wage (Nominal)	10 948	3.21	23.89
Wife's wage (Nominal)	10 948	0.756	12.342
Husband's wage (Real)	10 948	3.139	24.399
Wife's wage (Real)	10 948	0.032	0.903
Remittance	10 948	129.497	627.652
Husband's paid hours	10 948	40.333	22.963
Wife's paid hours	10 948	30.224	24.247
Husband's unpaid hours	10 948	8.794	13.327
Wife's unpaid hours	10 948	34.360	27.628
Husband's age	10 948	43.869	13.807
Wife's age	10 948	36.326	11.590
Children under 5	10 948	3.370	5.162
Urban (Ref: Rural)	10 948	0.352	0.478
Primary education (Ref: None)	10 948	0.271	0.445
Basic education	10 948	0.162	0.369
Secondary education plus	10 948	0.080	0.271
Ga-Dangme (Ref: Akan)	10 489	0.080	0.271
Ewe	10 489	0.120	0.325
Guan	10 489	0.046	0.210
Mole-Dagbani	10 489	0.212	0.408
Grusi	10 489	0.035	0.183
Gurma	10 489	0.045	0.208
Other ethnic	10 489	0.040	0.196
Union membership	10 948	0.170	0.375
Sector of employment	10 948	0.275	0.446

GLSS, Ghana Living Standards Survey.