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TO THEIR AGENCY IN RURAL EGYPT?**

**Rania Salem, Yuk Fai Cheong,  
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## Abstract

Whether work is performed for household members' consumption (subsistence work) or for sale to others (market work), it may be an enabling resource for women's agency, or their capacity to define and act upon their goals. The present paper asks: Do women who engage in market work have higher agency in the three domains of economic decision-making, freedom of movement, and equitable gender role attitudes, compared to those who engage in subsistence work and those who do not work? To address this question, we leverage data from a probability sample of ever-married women in rural Egypt. We use latent-variable structural equation models with propensity score matching to estimate the influence of women's work on three domains of their agency. We find no effect on gender attitudes or decision-making. However, women's subsistence and market work are associated with increasingly higher factor means for freedom of movement, compared to not working.

**JEL Classifications:** J1, J6

**Keywords:** Women Engagement, Market Work, Freedom of Movement, Egypt

## ملخص

ما إذا كان أداء العمل للاستهلاك لأفراد الأسرة " (أعمال الإعاشة) أو للبيع للآخرين (العمل في السوق)، قد يكون موردا مواتاة لوكالة المرأة، أو قدرتها على التصرف بناء على أهدافها. تطرح هذه الورقة السؤال التالي: هل لدى النساء المنخرطات في العمل في السوق وكالة عالية في المجالات الثلاثة من عملية صنع القرار الاقتصادي، وحرية التنقل، والأدوار المنصفة بين الجنسين، مقارنة مع أولئك الذين ينخرطون في أعمال الإعاشة وأولئك الذين لا يعملون؟ لمعالجة هذه المسألة، نستفيد من البيانات من عينة احتمالية من النساء اللواتي سبق لهن الزواج في الريف المصري. نستخدم نماذج المعادلة الهيكلية الكامنة والمتغيرة مع درجة الميل وجاءت مطابقة لتقدير تأثير عمل المرأة على ثلاثة مجالات وكالتهم. لا نجد تأثير على المواقف بين الجنسين أو اتخاذ القرارات. ومع ذلك، يرتبط مستوى الكفاف وسوق عمل للمرأة بصورة متزايدة مع حرية التنقل، مقابل هؤلاء اللاتي لا يعملن.

## 1. Introduction

Women's empowerment recently has been elevated to a key objective for policies and programs in low- and middle-income countries, as evidenced by the third UN Millennium Development Goal of promoting gender equality and empowering women. The empowerment of women is a worthy goal in itself, and researchers have shown that women's empowerment is associated with children's welfare and economic growth, among other societal benefits (Anderson and Eswaran 2009). Women's *empowerment* refers to their acquisition of enabling resources, which may, in turn, enhance their *agency*, or capacity to define and act upon their goals (Kabeer 1999). Women's economic activity may be an important enabling resource for their agency. Whether performed for household consumption (subsistence work) or for barter or sale to others (market work), these economic activities may give women access to material resources and social roles that may be preconditions for their agency (Kabeer 2005a). Yet, few scholars have assessed systematically how the various types of women's economic activity influence the various domains of their agency (Anderson and Eswaran 2009; Balk 1997; Chakrabarti and Biswas 2012; Kabeer 2011b; Kantor 2003; Mason 2005).

The benefits of women's market work for their agency may stem from the earnings that are generated, which may afford women more independence, higher status, and greater bargaining power within and outside the household (Kabeer 1997). The benefits of women's subsistence work are less clear, in part because unremunerated work is understudied. On the one hand, subsistence work may contribute important goods and services to the household economy, freeing resources for other expenditures and thereby enhancing the welfare of its members (Langsten and Salem 2008). On the other hand, the low status accorded to many feminized types of subsistence work, coupled with the high cultural value placed on the role of housewife (Hoodfar 1997; Kantor 2003; MacLeod 1991), may translate into a negative association between women's subsistence work and their agency.

To date, the influences of Egyptian women's engagement in market and subsistence work on the various dimensions of their agency are not studied. The present paper fills this gap, enhancing our understanding of the economic preconditions for women's agency in rural Minya, Egypt, by assessing the influence of women's market and subsistence work on three domains of agency: their influence in family economic decisions, their freedom of movement, and their vocalization of views favoring more equitable gender roles and rights. We ask: *Do women who engage in market work have higher agency in all three of its domains compared to women who engage in subsistence work and those who do not work?*

## 2. Background

### 2.1 Defining and measuring women's empowerment and agency

Drawing on the theoretical work of economist Naila Kabeer (1998, 1999, 2001, 2005a,b), we define *women's empowerment* as the process by which a woman acquires *enabling resources*, which in turn may enhance her *personal agency*, or her ability to define and to make strategic life choices. Enabling resources may be *human*, such as schooling attainment (Kabeer 1998). They may also be *economic*, such as earnings or assets (Kabeer 2005a), and they may be *social*, such as membership in formal or informal extra-familial networks (Kabeer 2011a; Kabeer and Huq 2010). In this paper, we conceptualize women's agency as encompassing women's *observable actions*, including their influence in family economic decisions and their movement in public spaces, as well as their *ideational agency*, measured in terms of their expression of views favoring equitable roles and rights for women vis-à-vis men (Kabeer 1999; VanderEnde et al. nd.; Yount et al. nd.).

Existing qualitative research suggests that family economic decision making, freedom of movement, and attitudes about women's roles and rights vis-à-vis men are contextually relevant indicators of Egyptian women's agency. One ethnographic account has described how

struggles between Egyptian husbands and wives often concern the allocation of household earnings, making it evident that women value the ability to control the family budget (Hoodfar 1997). Another study reports that micro-credit recipients' newly won ability to leave the home unaccompanied is regarded by women as facilitating their pursuit of their needs (Drolet 2011; VanderEnde et al. nd.; Yount et al. nd.). Egyptian women also speak of cultivating values of gender equality in their children as a means of transforming gender norms through the next generation (Henry 2011; VanderEnde et al. nd.; Yount et al. nd.).

In this study, women's agency is measured using indices based on 21 questionnaire items that reflect the priorities and concerns of Egyptian women, as shown in the literature. Three underlying domains of agency have emerged from exploratory factor analysis using the above mentioned questionnaire items: economic decision-making in the family, freedom of movement, and equitable gender-role attitudes (VanderEnde et al. nd.). In the methods section below, we describe in greater detail the multidimensional latent variables that constitute our outcome measure.

## ***2.2 Defining and measuring women's work***

To capture women's market work, the Egyptian census and national surveys, such as the Egypt Demographic and Health Surveys (EDHS), typically have used single keyword questions about "work for cash or kind" (Anker 1983; Anker and Anker 1989). Yet, single keyword questions on market work have failed to capture the full range of women's engagement, including in informal, home-based, intermittent, part-time, and/or temporary market work (Anker and Anker 1989; Donahoe 1999; Langsten and Salem 2008; Yount et al. 2014). Efforts to capture more fully women's work (including market and subsistence work) have involved the design and use of short lists asking women about specific activities that women typically perform (Anker 1983; Anker and Anker 1989). In a survey of ever-married women ages 15–49 years in 2003–4, estimates of the same work by women based on an activities list were more than three times higher than those based on a single keyword question (64.5% vs. 21.9%) (Langsten and Salem 2008). Thus, variable definitions of women's work and changes over time in the methods to capture it complicate our understanding of levels and trends in this measure.

We adopt an extended definition of women's work, which includes tasks performed for the market as well as for subsistence. Market work encompasses economic activities that involve remuneration in either cash or kind, and may include unpaid work for a family business that indirectly brings in a profit. Subsistence work encompasses unpaid activities that involve the production of goods or the provision of services for household consumption (Yount et al. 2014).

## ***2.3 Women's work as a resource for their agency***

Theoretical perspectives emanating from the Marxist and Modernization traditions emphasize that the effects of women's work are contingent on the structural position of their employment in the international, domestic, and household economies (Kabeer, Mahmud, and Tasneem 2011c). Researchers have argued that women's work, particularly paid employment performed outside the home, enhances agency in part because it gives women access to identities, roles, and opportunities that transcend those of mother, kinswoman, and homemaker (Kabeer 1997). Yet, this interpretation assumes that such identities, roles, and opportunities are culturally valued. The agentic potential of women's work likely varies depending on the social acceptability of their work (Kabeer, Mahmud, and Tasneem 2011c), implying that if certain types of work are seen as status-compromising or stigmatizing, they will not enhance women's agency. A contextualized understanding of the structural and cultural position of women's market and subsistence work in Egypt is needed if we are to assess the influence of such work on specific domains of women's agency.

## 2.4 Qualitative and quantitative insights from Egypt

Several qualitative studies in Egypt argue implicitly for considering how the structural position and cultural meanings of women's work jointly determine the effects of work on women's lives. Hoodfar's (1997) ethnography of several low-income Cairene neighborhoods shows that married women articulate clear status hierarchy of roles, which places skilled governmental jobs at the pinnacle, followed by home-making and low-status, low-skilled work. The first category is accessible only to educated women with influential social contacts. The second is occasionally combined with home-based subsistence work, and the third usually consists of petty trading in the neighborhood, domestic service, or factory work (Drolet 2011; Hoodfar 1997). In rural Egypt, women themselves and those in their communities do not regard economic activities such as cultivation and selling in the market as desirable for women (Jensen 1993; Sharp et al. 2003). Although such work may offer material rewards for women and their families, it represents an added burden for women, who remain primarily responsible for domestic chores and childcare. Only poorer women and widows take up such activities, typically as a last resort forced on them by circumstance rather than as an emancipatory act (Sharp et al. 2003). Thus, qualitative evidence from Egypt suggests that, unless women hold highly skilled formal jobs, many ordinary people view women's paid and unpaid work as socially devalued and therefore of little benefit in terms of women's agency, with many women having neither the skills nor the social relationships needed to secure a high-status job, preferring instead the status of housewife (Drolet 2011; Hoodfar 1997; Jensen 1993).

Quantitative studies in Egypt yield different results about whether women's work is a determinant of dimensions of their agency, as defined here. With respect to *decision-making*, on the one hand, two studies find that market work enhances agency, contrary to what we might expect based on the qualitative research cited above. Kishor (1995) finds nationally that women who perform market work have greater reported influence in family decisions, regardless of whether women earn cash or kind. Likewise, Yount (2005) finds in rural and urban Minya that women who ever performed market work for cash or kind have significantly higher scores for their extent of influence in "daily domestic" and "life course" decisions. On the other hand, Govindasamy and Malhotra (1996) report mixed findings for the associations of Egyptian women's cash and in-kind market work with contraceptive decision-making, and Salem (2011) suggests that, relative to not working, neither paid market work nor unpaid subsistence work are associated with gains in decision-making power, net of controls. Regarding Egyptian women's *freedom of movement*, it appears to be greater among those who do market work, irrespective of whether they earn in cash or kind, compared to all others (Kishor 1995). Few studies from Egypt consider *ideational agency*, but Kishor (1995) finds that non-normative *gender attitudes* (specifically preference for own or joint decision making regarding children and for non-customary roles) are most common among women who perform cash market work, followed by women who do not work at all, followed by women who perform in-kind market work. Another study finds that married women's preference for own reproductive decision making is higher only among in-kind market workers, compared to non-workers (Govindasamy and Malhotra 1996). A final analysis from Egypt shows that only formal market work performed outside the home is significantly associated with a composite measure of women's empowerment<sup>1</sup> (Kabeer 2011b). Taking together the results of these quantitative studies on three domains of agency, it is apparent that subsistence work has been understudied in favor of an approach that contrasts market workers (a category that includes those paid in cash and in kind) with non-workers (a category that may actually lump subsistence workers with the economically inactive). Because these findings for decision-making, freedom of movement,

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<sup>1</sup>Kabeer's (2011b) empowerment outcome consisted of a composite measure that included items capturing women's input in household decision-making, their inter-personal relations, their community participation, and their involvement in individual and collective forms of political agency.

and gender attitudes mostly offer insights about the relative agency of market workers and non-workers without regards for the agency of subsistence workers, it is difficult to reconcile these findings with those reported in the qualitative literature from Egypt. Overall, when comparing market workers to non-workers, the quantitative evidence regarding decision-making among Egyptian women is contradictory and therefore inconclusive. According to these same quantitative findings, Egyptian women's market work does appear to be more strongly, positively related to freedom of movement and gender attitudes than non-economic activities.

*Quantitative Insights from the Patriarchal Belt.* The small number of quantitative studies from Egypt make comparisons relatively simple; however, the size and variability of the literature on the relationship between women's work and their agency from other low- and middle-income countries in the so-called "patriarchal belt" (Kandiyoti 1988) defies easy characterization. This difficulty arises in part because studies of this kind have formulated three levels of refinement in their measurement of women's work: 1) work (variously defined) versus no work; 2) unpaid subsistence versus paid market work; and 3) more refined classifications such as home-based versus non home-based work (variously defined) or formal versus informal work, the latter of which lacks a standard definition. We discuss each of these approaches to measuring women's work and its association with the three domains of women's agency in turn.

In the first category of studies, findings with regards to *decision-making* indicate that when contrasted with non-workers, working women (variously defined) tend to have more influence in important decisions. Among ever-married women nationally in India, women who perform remunerated work have higher decision-making scores than all others (Chakrabarti and Biswas 2012). Currently married rural women ages 15-39 in two Indian states similarly have significantly greater decision-making authority if they were engaged in wage work in the last 12 months (Jejeebhoy 2000). A study of ever-married women in rural Bangladesh indicates that women who work outside the home enjoy significantly more decision-making authority than all other women, net of controls (Balk 1997). Among young married women in one district of Sri Lanka, women's financial decision-making is significantly higher with more years of past paid work experience and is significantly higher for women who are performing paid work (Malhotra and Mather 1997). In this same study, other types of decision-making, namely on social and organizational matters, are not associated with women's work experiences (Malhotra and Mather 1997).

In the second category of work classifications, studies have assessed the associations of paid and unpaid work on women's *decision-making*. An early study of several Nepalese village households indicates that women spending a higher proportion of time on unpaid subsistence work (compared to time spent on paid market work) have greater input in farm management decisions. Women spending a higher proportion of time on paid market work (compared to time spent on unpaid subsistence work) have greater influence on decisions about resource allocation and domestic activities, and less input in farm management decisions (Acharya and Bennett 1983). Another national study in Nepal finds that married women agricultural workers ages 15-49 and living with their husbands have greater input into household decisions if they report being paid in cash, followed by women who report being paid in kind, followed by women who are unpaid workers (Allendorf 2007). Based on a survey in Matlab, Bangladesh, Anderson and Eswaran (2009) find that women's time spent performing paid market work has a greater positive effect on women's decision-making than time spent performing unpaid subsistence work. Moreover, women who work for no pay have no more decision-making power than housewives who are not economically active (Anderson and Eswaran 2009).

Finally, we discuss studies that use more detailed categorizations of women's work in relation to women's *decision-making*. In one of the few studies that compares associations with

different types of work women perform, Kabeer and colleagues (2011c) find in Bangladesh that, compared to the agency of women who are not economically active, decision-making regarding one's own health care is significantly higher among women who perform paid formal work outside the home, followed by women who perform paid outside informal work, followed by women who perform paid work inside. The likelihood of decision-making regarding purchases of assets using the respondent's own income also depends on work type, but is significantly higher only for women working in formal paid work outside the home relative to women not working at all, net of controls.

Having discussed the findings with respect to decision-making, we now turn to *freedom of movement*. Here findings are more varied. In the first category of work classifications that employ measures contrasting workers and non-workers, some researchers report that Bangladeshi women who work outside the home are not more spatially mobile than other women (Balk 1997). In contrast, others report that market-working Indian women have greater freedom of movement than all others (Chakrabarti and Biswas 2012) or that Indian women who performed wage work in the last 12 months have significantly greater freedom of movement (Jejeebhoy 2000). To our knowledge, no studies in the second category of work classifications presently test the influences of paid versus unpaid work on women's freedom of movement. In the third category of work classifications, Kabeer and colleagues find in Bangladesh that women's reported comfort in moving around in public spaces is highest among women with more formal, non-home based, and paid work (2011c).

Few studies in the belt of classic patriarchy test work as a determinant of women's *attitudes about gender*. One exception is Lu (2011), who applies the first classification of work and finds that gender role attitudes are no more egalitarian among women workers than women non-workers in Taiwan, net of other factors. To our knowledge, only one study includes in its measure of agency a dimension for women's gender attitudes similar to the one we use in this study, and it uses the third classification of work. Among ever-married women in Bangladesh, women's odds of agreeing that a woman's income increases the respect she receives from her family does not differ according to the type of work she performs (Kabeer, Mahmud, and Tasneem 2011c). Compared to economically inactive respondents, only respondents who performed formal work outside the home have higher odds of agreeing that a woman's income increases the respect she receives from the community. Finally, son preference is not associated with the type of work women perform in Bangladesh (Kabeer, Mahmud, and Tasneem 2011c). Other studies from the belt of classic patriarchy have not considered gender attitudes as a dimension of women's agency, but still have provided insights into the relationship between women's work and their attitudes about intimate partner violence, a key aspect of our measure of gender attitudes. In their study of attitudes about violence against wives using the Demographic and Health Surveys, Rani and Bonu (2009) find that compared to non-workers, working women who are paid in cash or kind in Armenia, India, and Cambodia have higher odds of justifying wife beating. Only working women who are paid in cash have higher odds of justifying wife beating in Turkey, and in Kazakhstan and Nepal, no significant association between women's work and their justification of wife beating emerges (Rani and Bonu 2009). Using similar outcomes among married women in Iraq, Linos and colleagues (2009) find that non-workers are more accepting of wife beating than are workers. Research that uses more nuanced measures of women's work as predictors of women's attitudes about intimate partner violence is needed. Furthermore, causal research on the impacts of women's work on all domains of their agency is needed. With the exception of Anderson and Eswaran (2009), all the studies reviewed are associational as they do not attempt to control for the fact that women's work and their agency may be endogenous to one another.

## **2.5 Hypotheses**

The foregoing discussion motivates three hypotheses. Where a sufficient number of studies exist to inform our predictions regarding a particular domain of agency, we base our hypotheses on the quantitative literature from Egypt, and otherwise we draw on insights from the international literature. All else being equal, we expect that:

H1. Scores for women's influence in family economic decisions will be undifferentiated according to whether women perform market work, subsistence work, or do not work.

H2. Scores for women's freedom of movement will be highest among women who perform market work, followed by women who perform subsistence work, and finally those who do not work. And,

H3. Scores for women's expression of views that favor women's equitable opportunities and rights vis-à-vis men will be highest among women who perform market work, followed by women who perform subsistence work, and finally those who do not work.

## **3. Methods**

### **3.1 Setting**

Our study site, rural Minya governorate, is located 250 km south of Cairo in Upper (Southern) Egypt. Minya is home to 4.2 million residents, 81.1 percent of whom live in rural areas. Compared with other Egyptian governorates, Minya ranks near the bottom on indicators of human development. Contrasted with their Northern Egyptian counterparts, Southern Egyptians typically have less schooling and higher rates of unemployment, poverty, and mortality (Yount et al. 2014; VanderEnde et al. nd.; Handoussa 2010).

### **3.2 Sample**

Our study sample includes ever-married women ages 22–65 years living in rural Minya, Egypt, who responded to both the 2005 EDHS and a follow-up survey in 2012 (VanderEnde et al. nd.; Yount et al. 2014). For the 2005 EDHS, an urban/rural stratified three-stage cluster sample was drawn from an update of the 1996 national census (Yount et al. 2014; El-Zanaty and Way 2006). For the 2012 follow-up, all 328 women who completed the partner violence module of the 2005 EDHS in rural Minya were selected for interviews, in addition to 514 women selected using the kish method from the remaining interviewed women in rural Minya (Yount et al. 2014; Kish 1949). A total of 608 women completed interviews, for a follow-up response rate of 72%. Attriters and non-attriters were similar on most of 14 attributes measured in 2005, including marital and work status (Yount et al. 2014). Our sample for the descriptive analyses presented here included 600 women with complete information on the work variables. For the remaining analyses, the sample included between 580 and 608 women, depending on whether they had complete information on the agency-related items and the covariates considered.

### **3.3 Data and variables**

*Women's agency.* Our measure of women's agency was developed using exploratory factor analysis (EFA) (VanderEnde et al. nd.). We leveraged the final three-correlated factor model from that analysis as our set of outcomes here. In the prior analysis, 25 items initially were chosen from the 2012 follow-up survey to represent one of three dimensions of women's agency: influence in family economic decisions (DM); freedom of movement (FM); and the vocalization of views that challenge prevailing gender norms (GA). Removing negative and cross-loading items, a three-factor EFA model with 21 items had good model fit (VanderEnde et al. nd.).

*Women's subsistence and market work.* Two variables captured women's economic activities from data collected using the activities module in the 2012 survey (Yount et al. 2014). *Engagement in subsistence work* captured whether or not in the prior 12 months the woman

performed any of 12 economic activities, without a return in cash or kind.<sup>2</sup> *Engagement in market work* captured whether or not in the prior 12 months the woman performed any of 20 economic activities for any return in cash or kind.<sup>3</sup> Our treatment variable thus classifies women according to whether they engaged in neither subsistence nor market work (36%), subsistence work only (47%), or any market work (18%) in the prior 12 months.

*Covariates.* In our analysis, we considered eight variables to compare initial differences in the attributes of the three work groups, to generate propensity scores, and to control for potential confounding of the relationship between women's work and their agency. Most of these variables pertain to respondents' own characteristics and were measured in 2012. These include each woman's *age* in 2012, whether her *religion* was Christian or Muslim, whether she received *any secondary schooling*, whether she *worked in the year before she first married*, and whether she *first married before the age of 18 years*. We also considered variables pertaining to the respondent's parental characteristics, namely whether her *mother had any schooling*, as well as whether her *father had any schooling*. In addition, we considered a categorical measure of *household wealth* derived from a principal components analysis of household assets and amenities for the national 2005EDHS sample. Lastly, our final models predicting the three domains of agency included two covariates that we hypothesized to be important determinants of agency. The first was whether or not the *respondent was living with her mother in law*, which we expected to be negatively associated with the three domains of agency. The second was whether the *respondent was living in close proximity to her natal or birth family* (close enough to be able to visit them and return home in a day), which we expected to be positively associated with the three domains of agency.

### 3.4 Analysis

*Descriptive analyses.* We conducted univariate analysis of all variables to assess their completeness and distributions. We conducted bivariate analyses to assess prior differences across the three work groups in potential confounders for which we would need to control in our analyses (e.g., associated with women's work and domains of agency).

*Exploratory structural equation modeling.* Exploratory structural equation modeling (ESEM) (Asparaouhov and Muthén 2009) was used to examine mean differences across the three work groups (no work, subsistence work only, any market work) on the latent variables of the three dimensions of women's agency: economic decision making in the family (DM), freedom of movement (FM), and the adoption and the vocalization of views that challenge prevailing gender norms (GA). Using multiple indicators-multiple causes (MIMIC) structural equation models, we evaluated measurement invariance of the 21 indicators of the three latent agency factors across the three work groups. We tested whether any of the indicators may display differential item functioning (DIF) (Clauser and Mazor 1998; Holland and Thayer 1988). An item displays DIF when its expected score is unequal between subpopulations of women (e.g., no work vs. any market work), while conditioning on their latent traits of agency. The goal was to ensure that any group differences found were not attributable to DIF.

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<sup>2</sup>These 12 economic activities come from the questions "In the last 12 months, have you... done anything in the fields such as harvesting, cutting clover, or watering plants... raised livestock or sold livestock or milk... raised or kept birds or poultry or sold birds or eggs... done sewing or embroidery (or similar)... prepared vegetables (or similar)... made butter, ghee, cheese (or similar)... done sewing or embroidery (or similar)... sold something (else) from the market... sold something (else) from home... done construction work, such as carried cement, bricks, or sand... worked in someone else's home... done anything else similar?" combined with the question "In the past 12 months, did you or anyone else receive any return in money or goods for (type of work) (or for selling the products of this work)?"

<sup>3</sup>These 20 economic activities included the 12 listed previously and any additional activities reported to have generated a return in response to the questions "In the last 12 months, have you... sold something (else) in a shop... worked in an office or school... worked in a hospital or clinic... worked in a bank... worked in a government office or public sector... worked in a restaurant or hotel... worked in a factory or workshop... done anything else similar?"

*Propensity score adjustment method of estimating effects of women's work on agency.* The standard method of statistical adjustment, namely including relevant confounders of the relationship between women's work and agency, is not sufficient to obtain an unbiased estimate of the causal effect of women's work on their level of agency. Following procedures described by Spreeuwenberg and colleagues (2010), we estimated multiple propensity scores (Imbens 2000; Rosenbaum and Rubin 1983) and used them as covariates to reduce overt biases due to observed pretreatment differences resulting from the lack of random assignment of women to the three work groups. Work and agency are likely reciprocally causal, but they may be jointly determined by other variables that confound their relationship as well. Adjustments with propensity scores and covariates attempt to reduce the observed components of this bias, but these methods do not account for confounding on unobserved variables. Therefore bias is likely reduced, but not eliminated, with the approaches we use here.

In what follows, we present a description of the sample and results from each of the seven steps described by Spreeuwenberg and colleagues (2010), namely (1) using ESEM to predict agency before correction and checking measurement invariance, (2) assessing the initial comparability of the three work groups, (3) selecting variables for the multiple propensity score analysis, (4) estimating multiple propensity scores, (5) checking for overlap of the propensity score distributions, (6) conducting a balance check for similarity in the covariates across the three work groups after correction, and (7) estimating the effects of market and subsistence work (versus non-work) after correction.

## **4. Results**

### ***4.1 Sample Characteristics***

The majority of women who responded to the 2012 survey were economically active, with only 36% reporting that they had done no work in the past 12 months. Among all women, more reported performing subsistence work only (47%) than those who reported performing any market work (18%).

Women in the three work groups were similar on some characteristics and differed on others. They did not differ considerably in age (38 – 39 years), and Muslim and Christian women were about equally distributed across the three work groups. In other respects, however, women in the any market work category appeared to be advantaged relative to other women. Women in the market work group had more schooling (31% with any secondary schooling) than those in the subsistence work or no work groups (16% and 12%, respectively). A higher percentage of women in the subsistence only work group had married before age 18 years (76%) compared to the two other work groups, and a lower percentage of subsistence only workers belonged to the highest wealth category (8%). Although fewer women in the market work group had mothers with any schooling, these same women's fathers were more likely to have had any schooling than other women's fathers.

### ***4.2 Step One: Using ESEM to predict Agency Before Correction and Checking Measurement Invariance***

We employed exploratory structural equation models (ESEM) to estimate the effects of the three types of work on our three latent outcomes, namely women's decision-making (DM), freedom of movement (FM), and gender attitudes (GA). Built upon the three-correlated factor model of DM, FM, and GA previously fit and tested (VanderEnde et al. nd.), we formulated an ESEM model with work-group membership predicting the three latent outcome variables. We entered two dummy variables indicating work group membership, with the no work group as the reference category. We implemented these analyses using Mplus (Muthén and Muthén 1998-2012) with the mean and variance-adjusted weighted least squares estimators, an approach appropriate for handling ordinal data in factor analytic models.

The fit of the initial model was acceptable ( $\chi^2_{108}=459.468$ ,  $p<0.001$ , RMSEA = 0.05, CFI = 0.965), and there were significant differences in the factor mean for FM between women who engaged in any market work and women who did not work, as well as between women who engaged in subsistence work and women who did not work. Compared to the women who did not perform any work, women who engaged in any market work reported a significantly higher level of freedom of movement ( $\gamma = 1.005$ , S.E. = 0.192,  $\gamma/S.E. = 5.225$ ,  $p < 0.001$ ), and women who performed subsistence work only also had a significantly higher mean ( $\gamma = 0.391$ , S.E. = 0.115,  $\gamma/S.E. = 3.404$ ,  $p < 0.01$ ). No significant group differences were found in the outcomes DM or GA between women who performed either type of work and those who performed no work.

The above comparisons are meaningful, however, only if the indicators for agency are invariant across the work and no-work groups. Following recommended procedures (Brown 2006; Muthén and Asparouhouv 2002), we used MIMIC models to assess differential item functioning (DIF)(Clauser and Mazor 1998; Holland and Thayer 1988) across the any work and subsistence only groups, versus the no work group. All the direct links between the work group membership dummy variables and the manifest indicators were fixed to zero and possible work group non-invariance was tested as guided by the modification indices (Brown 2006). Two items with DIF by work group were identified. Significant direct effects were found for a DM item asking “who in your family usually makes the following decisions...about your visits to your family or relatives?” favoring the any market work group in self-reported personal influence, and a GA item assessing a woman’s agreement with the statement: “if the family doesn’t have enough money to send all the children to school, it is better to send a son to school than it is to send a daughter” favoring the any subsistence group in self-reported equitable gender norms. We opted not to remove these two items displaying DIF for several reasons. First, removal may adversely affect the content validity of the scale. Second, retaining the two items would facilitate comparison of the scale to its use in other research (Brown 2014). Third, removal of the two items may have unintended consequences on other groups that were not the focus of this analysis due to possible interactions among groups (Dorans and Holland 1993). Finally, because we found that inclusion or exclusion of the two DIF items yielded the same substantive results, in the following models the 21 items were retained while adjusting for the DIF of the two items identified.

After adjusting for the direct effects of work group on the above two agency items, there were still significant between-group differences in self-reported freedom of movement. In this model, factor means for freedom of movement remained significantly higher for the any market group ( $\gamma = 0.964$ ) and for the subsistence only group ( $\gamma = 0.353$ ) than for the no work group. Factor means for decision making and attitudes about gender did not differ significantly across work groups.

#### ***4.3 Step Two: Assessment of the Initial Comparability of the Three Work Groups***

Next we assessed the initial comparability of the three work groups according to the covariates outlined in the Data and Variables section using the no work group as the reference category. Although this balance check does not inform the variable selection for the multiple propensity score model, it indicates that the three groups differed significantly ( $p < 0.10$ ) in quartiles of wealth, religion (Muslim versus other), whether the woman had received any secondary schooling, whether the woman’s father had received any schooling, whether the woman worked before marriage, and whether the woman was first married under age 18. Specifically, having any secondary schooling, having a father with any secondary schooling, and belonging to the wealthiest two quartiles of households was significantly and positively associated with performing any market work. Having worked in the year before marriage was significantly and positively associated with performing subsistence work only. Being Muslim and having

first married under age 18 were both negatively associated with performing subsistence work only, though only at the  $p < 0.10$  level of statistical significance.

#### ***4.4 Step Three: Selecting Variables for the Multiple Propensity Score***

As a next step, we selected variables for the multiple propensity score estimation. We applied two criteria for the selection of these variables (Brookhart et al. 2006; Wyss et al. 2013). *According to the first criterion*, each of the variables had to precede temporally women's market or subsistence work in the prior year, as reported in 2012. We identified women's age in 2012, religion, secondary schooling, first marriage before age 18 years, and parental schooling as variables measured in 2012 that could reasonably be assumed to precede causally women's work. We included a variable measuring whether the woman had performed market or subsistence work in the year before her (first) marriage to control for the potential influence of the woman's premarital economic activity on the timing of this marriage. Household wealth also was included, since it was measured in the 2005 survey.

*According to the second criterion*, each of these variables is hypothesized to be associated with women's assignment to work categories *and* to women's agency. We posited that women's agency should increase with older age (Yount et al. 2014), and that older women would be more likely to be available to work because their children would be more likely to have reached school age. We also expected that Christian women would have higher scores for agency because of the Church's greater exposure to international missions and organizations, and the likely effect that such exposures might have on Christian women's attitudes about gender (Yount 2004). As a religious minority, Christian women might also have greater motivation to work than Muslims. We also hypothesized that women with more schooling and with more-schooled parents would both be more likely to work and to have greater agency. Early first marriage (before age 18 years) was hypothesized to be positively associated with market work in the prior year (because children would be older and less likely to require daily care) and negatively associated with agency, net of having worked before marriage. Household wealth was hypothesized to be positively associated with any market work and with agency.

Except for age at first marriage and work in the year before marriage, our expectations regarding the associations of covariates with scores for agency in most cases were met. Following Spreeuwenberg and colleagues' (2010) guideline, we used an alpha level of 0.10 as an inclusion criterion. As there were multiple outcomes on agency, we followed the guidelines of Wyss and colleagues (2013) and chose one set of generic-outcome propensity scores and included all the covariates that predicted at least one of the three latent outcomes. Wyss and colleagues (2013) showed that the generic-outcome model performed well in terms of precision and bias with two treatment groups.

#### ***4.5 Step Four: Multiple Propensity Score Estimation***

Given the results reported above, multiple propensity scores were estimated with all eight selected covariates as predictors and the work group membership as the dependent variable. Multinomial regression analyses were used to compute the estimated predicted probabilities of assignment to each work group. We used one set of generic-outcome propensity score models using SPSS (IBM Corp. 2011). Using Stata 12.0 (Statacorp 2012), we checked the Independence of Irrelevant Alternative Assumption (IIA), which states that the odds for any pair of outcomes (work membership categories) are determined without reference to the other outcomes that might be available. The results of the test suggested that the assumption was tenable (available upon request).

#### ***4.6 Step Five: Check for Overlap of the Propensity Score Distributions***

We next created box plots to provide a visual check for the extent of overlap, indicating the probability that each participant in a specific work membership group also has a certain

probability of having been assigned to the other two groups. The more the overlap of the propensity score distributions, the greater is the common support (Laneshart et al. 2012). In most cases, the box plots indicated considerable overlap in the propensity score distributions.

#### ***4.7 Step Six: Balance Check after Correction***

In step six, we checked the balance or the similarity of the covariates across the three work groups using a significance test. Balance was achieved for all of the eight covariates. All of the effects reported in step 2 became non-significant after we added two out of three propensity scores and their mutual interactions as covariates. We proceeded with further analysis as a result.

#### ***7.8 Step Seven: Effect Estimation after Correction***

Finally, we estimated the effects due to work and found that after correction, as indicated in Table 1, there were still significant between-group differences in factor means for women's freedom of movement. We also ran another model with covariates already used for estimating multiple propensity scores. As Shadish and Steiner (2010) indicated, this procedure with its covariance adjustment might help to reduce the bias due to the misspecification of the propensity score model. The results were largely similar (Table 1). We added to the models another two covariates, namely proximity to respondent's natal family and co-residence with the mother-in-law. Re-estimating the effects yielded similar results, indicating that the results were robust to the inclusion of these important determinants of women's agency.

Subsistence and market work retained their positive association with freedom of movement, net of the two covariates representing the respondent's proximity to her natal family and co-residence with her mother-in-law. Neither of the other two domains of agency were significantly affected by the respondent's work group membership. Other results are noteworthy. After adjustment for all covariates, older age did not confer greater agency among rural Egyptian women. Muslim women in our sample reported significantly lower freedom of movement scores than did Christian women, although religion had no bearing on scores for the other two domains of agency. Women who themselves had any exposure to secondary schooling or whose fathers received any schooling had significantly higher freedom of movement scores than others. Having worked in the year before marriage predicted a greater perceived level of freedom of movement as well. Two surprising findings stand out. First, contrary to expectations, living in close proximity to her natal family was associated with significantly lower decision-making scores. This variable was the only one that was significantly associated with decision-making. Second, women living in the wealthiest households reported significantly lower freedom of movement scores than did those living in poorer households. The persistence of this association even after accounting for women's work is notable.

### **5. Discussion and Conclusions**

In this paper, we have compared the influence of market and subsistence work versus no work on the agency of rural ever-married women in Minya, Egypt. Although women's economic activities have been identified as an important determinant of their agency and related constructs, the literature for low- and middle-income countries has largely failed to distinguish between the types of work that women perform and their differential effects on women's agency. Notably little is known about the influences of Egyptian women's engagement in subsistence work on the various dimensions of their agency. The present study benefits from detailed survey measures of rural Egyptian women's work and agency, constructs that often have lacked accurate measurement in prior research and have never been measured in conjunction in such detail in Egypt. Following Anker (1990, 1995) and Langsten and Salem (2008), our survey of women in rural Minya used a detailed and contextualized activities list to measure market and subsistence work, allowing for the identification of multiple activities

performed by the same woman, and collected further information on the main activity carried out by each woman. This approach avoids the pitfalls of keyword questions about women's work, which disproportionately exclude the most disadvantaged workers (Langsten and Salem 2008). Our survey also included detailed measures for multiple domains of women's agency corresponding to the three domains of women's influence in family economic decisions, freedom of movement, and the vocalization of views favoring more equitable gender roles and rights. Finally, in contrast to the associational approach taken by most prior studies, our analysis controlled for the endogeneity of women's work by using a propensity score adjustment approach.

Several methodological insights from our analysis are notable. Our results highlight the potential importance of accounting for measurement invariance when assessing the associations between women's work and their agency, as well as its importance in ensuring valid between-group comparisons. Specifically, we found two items demonstrating DIF by work group. First, even with the same DM trait level, women in the market work group scored significantly higher than those in the no work group in the rating of personal influence in decisions regarding visits to friends and family. It is possible that women engaged in market work had less free time available for visits to friends and relatives, and thus interpreted this item differently. In a separate analysis of women's agency in Egypt using a nationally representative sample, a similarly worded item demonstrated DIF by women's age at first marriage (Yount et al. nd.), suggesting further qualitative research may be helpful in exploring women's interpretation of this item. Second, even with the same GA trait level, women performing subsistence work only scored higher than their counterparts who performed no work in rejecting the preference for educating sons over daughters. Reasons for this difference are not clear, but may warrant further exploration in qualitative and psychometric research. Still, our analysis allows one to ensure the between-group differences identified were not attributable to DIF by work group.

To reduce overt bias (Imbens 2000; Rosenbaum and Rubin 1983) in estimating the effects of type of work on women's agency, we employed multiple propensity scores as covariates in our regression models (Spreeuwenberg et al. 2010). Balance was achieved for all the covariates. Additional covariance adjustment with covariates was used in estimating the propensity scores (Shadish and Steiner 2010) and additional predictors were applied. In both instances, similar results were obtained. Our analytic strategy also illustrated how one could combine the MIMIC approach and the covariate adjustment approach to tackle simultaneously measurement and inferential issues in studying causal effects.

Our substantive findings are consistent with our initial hypotheses in some, but not all, instances. Regarding the effects of women's work on their influence in family economic decisions (H1), our ESEM findings adjusted for multiple propensity scores and covariates suggest that women's influence in family decisions did not differ according to their work in the prior year, as predicted. Notably, with the exception of one item (decisions regarding large purchases), our measure of decision-making was restricted to items that tap into domains of economic decision-making that are customarily reserved for women in rural Egypt. As a result of their work, the agency of women who are engaged in the labor market, particularly in paid employment, may expand to include influence over decisions that, in patriarchal societies, typically are reserved for men. If this is the case, our measure of decision-making would not capture this facet of women's enhanced agency.

Regarding the effects of women's work on their freedom of movement (H2), in our ESEM models adjusted for multiple propensity scores and covariates, we found as expected a dose-response effect for women's work. Namely, women's subsistence work and market work were associated with women's increasingly higher factor means for freedom of movement,

compared to women's non-work. The greater freedom of movement enjoyed especially by market workers but also subsistence only workers compared to non-workers may in part reflect their ability to leave the home without permission or accompaniment to fulfill work-related duties, which are likely combined with other tasks in public places. That said, we may be underestimating the impact of market work on women's freedom of movement, since some market workers in our sample may be home-based.

Finally, we found no effects of women's work on their gender attitudes (H3), contrary to expectations. Again, because some women in the subsistence only and market work categories are involved in assisting with family businesses and in performing home-based work, they may not be as exposed to more equitable attitudes about gender that circulate in non-family organizations (Thornton and Fricke 1987).

Some limitations of the study are notable. First, we lacked the sample size needed to disaggregate women's work into more detailed categories. For instance, the formality (enjoying social and health insurance and coverage by a formal employment contract versus not) of women's work may be an important determinant of the effect of work on women's agency, but relatively few women in our analysis reported this type of work in the prior year. Second, we did not ask about the location (home-based versus not) of women's market work performed, and so could not assess the effects of location on the three domains of agency measured. Despite these limitations, our ability to distinguish the effects of (probably largely home-based) subsistence work from market or remunerated work is arguably an important distinction in the Egyptian context.

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**Table 1: Exploratory Structural Equation Model Estimated Differences in Treatment Effects between the Three Treatment (Work) Groups after Correction on the Multiple Propensity Score, Ever-Married Women Aged 22-65 Years in Rural Minya, Egypt in 2012**

	After Multiple PS		After Multiple PS		After Multiple PS	
	Correction		Correction w/ Selected Covariates <sup>a</sup>		Correction w/ Full Covariates <sup>a,b</sup>	
	$\gamma$	SE	$\gamma$	SE	$\gamma$	SE
<b>Panel A. Decision-Making</b>						
Work Categories	-	-	-	-	-	-
No Work (reference)	-	-	-	-	-	-
Subsistence Work Only	-0.151	0.121	-0.160	0.117	-0.188	0.122
Any Market Work	-0.133	0.178	-0.151	0.181	-0.163	0.182
Propensity Score 1	-2.074*	0.976	-1.336	4.937	-3.904	5.591
Propensity Score 2	-1.937	2.102	-0.944	3.624	-3.066	3.874
Propensity Score 1*Propensity Score 2	3.401	5.338	5.010	9.915	0.409	10.286
<b>Panel B. Freedom of Movement</b>						
Work Categories	-	-	-	-	-	-
No Work (reference)	-	-	-	-	-	-
Subsistence Work Only	0.458***	0.115	0.492***	0.125	0.520***	0.126
Any Market Work	1.045***	0.213	1.083***	0.216	1.103***	0.226
Propensity Score 1	-1.986	1.130	-15.644**	5.308	-16.084	5.498
Propensity Score 2	-1.836	2.436	-2.113	3.907	-2.208	4.162
Propensity Score 1*Propensity Score 2	1.691	6.618	-12.441	9.336	-12.497	9.324
<b>Panel C. Gender Attitudes</b>						
Work Categories	-	-	-	-	-	-
No Work (reference)	-	-	-	-	-	-
Subsistence Work Only	-0.066	0.116	-0.500	0.121	-0.030	0.124
Any Market Work	-0.009	0.145	0.049	0.157	0.091	0.159
Propensity Score 1	0.282	0.924	-8.670	5.876	-7.444	5.954
Propensity Score 2	4.728*	1.982	-0.022	4.137	0.851	4.098
Propensity Score 1*Propensity Score 2	-10.246*	5.065	-14.976	10.912	-11.377	10.671
n	590		590		580	

Notes: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .  $\gamma$  indicates ESEM regression coefficient; SE, standard error. a Covariates include current age, religion (Christian, Muslim), any secondary schooling, worked in the year before marriage, first married under 18, mother had any schooling, father had any schooling, household wealth (poorest quartile, second quartile, third and wealthiest quartile). b Covariates include coresides with mother in law, lives in close proximity to natal family. Panels A, B, and C represent components of a jointly-determined model.