Demography (2019) 56:1247–1272
https://doi.org/10.1007/s13524-019-00793-3

The Impact of Childcare on Poor Urban Women's Economic Empowerment in Africa

Shelley Clark[1] · Caroline W. Kabiru[2] · Sonia Laszlo[1] · Stella Muthuri[2]

Published online: 8 July 2019

Abstract

Despite evidence from other regions, researchers and policy-makers remain skeptical that women's disproportionate childcare responsibilities act as a significant barrier to women's economic empowerment in Africa. This randomized control trial study in an informal settlement in Nairobi, Kenya, demonstrates that limited access to affordable early childcare inhibits poor urban women's participation in paid work. Women who were offered vouchers for subsidized early childcare were, on average, 8.5 percentage points more likely to be employed than those who were not given vouchers. Most of these employment gains were realized by married mothers. Single mothers, in contrast, benefited by significantly reducing the time spent working without any loss to their earnings by shifting to jobs with more regular hours. The effects on other measures of women's economic empowerment were mixed. With the exception of children's health care, access to subsidized daycare did not increase women's participation in other important household decisions. In addition, contrary to concerns that reducing the costs of childcare may elevate women's desire for more children, we find no effect on women's fertility intentions. These findings demonstrate that the impact of subsidized childcare differs by marital status and across outcomes. Nonetheless, in poor urban Africa, as elsewhere, failure to address women's childcare needs undermines efforts to promote women's economic empowerment.

Keywords Childcare · Women's economic empowerment · Employment · Daycares · Sub-Saharan Africa

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s13524-019-00793-3) contains supplementary material, which is available to authorized users.

✉ Shelley Clark
shelley.clark@mcgill.ca

[1] McGill University, Peterson Hall, 3460 McTavish, Montreal, QC H3A 0E6, Canada

[2] African Population and Health Research Center, APHRC Campus, 2nd Floor, Manga Close, Off Kirawa Road, PO Box 10787-00100, Nairobi, Kenya

Introduction

Demographers predict that by the end of this century, the world's population will increase by 4 billion. More than 80 % of this growth will occur in Africa, resulting in a nearly fourfold increase in its population size (Gerland et al. 2014). Future global poverty levels will be largely driven by the extent to which this growing population can generate income to support themselves and their families. In this context, African women are expected to play a particularly critical role in reducing family-level poverty and fostering economic development as a growing number enter into the labor market and engage in paid work (International Labor Organization (ILO) 2016). Hence, programs to enhance women's economic empowerment (WEE) have garnered considerable attention on the global development agenda as reflected in the fifth Sustainable Development Goal of the United Nations.

Most aims of WEE go beyond simply increasing women's labor force participation (Kabeer 1999; Tornqvist and Schmitz 2009). Here, we adopt the definition of WEE as "the process by which women acquire access to and control over economic resources, opportunities and markets, enabling them to exercise agency and decision-making power to benefit all areas of their lives" (Laszlo et al. 2017:6). Hence, employment alone does not fully satisfy the objectives of WEE if this work entails long hours in poorly paid and undesirable jobs. Nor would WEE be fully realized if women's greater economic engagement did not translate into higher levels of agency or autonomy—specifically their ability to participate in key household decisions that impact their and their children's well-being. Numerous scholars have argued that women's disproportionate childcare responsibilities act as one of the primary impediments to achieving these multiple dimensions of WEE and that subsidized early childcare (ECC) centers offer one of the few effective policies to mitigate this inequality (Cassirer and Addati 2007; Diaz and Rodriquez-Chamussy 2016; Folbre 2014; ILO 2016; Samman et al. 2016; Todd 2013; World Bank 2011).[1]

Yet, ironically, in the continent with the highest fertility rates, NGOs, policy-makers, and researchers generally perceive the least conflict between women's childcare responsibilities and their engagement with paid work. Programs that fall under the umbrella of WEE in sub-Saharan Africa typically emphasize increasing women's education, job training, and access to microcredit, but they do not focus on providing subsidized daycare. Furthermore, rigorous studies of the potential impact of subsidized daycare on WEE in Africa are lacking (Brown et al. 2014; Leroy et al. 2012). Many policy-makers and scholars consequently remain skeptical that limited access to affordable childcare poses a significant barrier to employment for African mothers (Korotayev et al. 2016).

This skepticism is typically based on two main assumptions. First, some researchers contend that affordable ECC is less important in this region given women's high level of participation in agricultural or informal work, which presumably can be easily combined with childcare (Korotayev et al. 2016; Quisumbing et al. 2007). Thus, most working African mothers have little need for center-based childcare. Yet, women may be overrepresented in the informal economy precisely because they are expected to perform the lion's share of unpaid care work (Cassirer and Addati 2007). If this is true,

[1] We use the terms *ECC centers*, *daycares*, and *childcare centers* interchangeably.

then provision of affordable ECC could not only increase women's engagement in paid work but also enable women to pursue better-paid jobs in the formal market.

Second, others point to the widespread availability of female kin, including grandmothers, aunts, and older sisters, who can presumably provide free childcare when the mother is working (Korotayev et al. 2016; Lokshin et al. 2000; Martinez et al. 2012). In fact, earlier demographic and anthropological research explicitly argued that unlike their Asian counterparts, African women experienced no conflict between participation in paid labor outside the household and childcare because of easy access to free childcare from their extended female kin (Ware 1977). More recent work, however, has noted that support from kin has potentially weakened (Clark et al. 2017; Foster 2000) and that in resource-poor settings, all adults may be required to participate in income-generating activities (Cassirer and Addati 2007).

A third rationale may also underlie the reticence on the part of policy-makers to focus on subsidized childcare programs in Africa. By reducing the effective price of children, a childcare subsidy may incentivize higher fertility. In developed countries, it has long been argued that easing of the worker-mother conflict—specifically through provision of low-cost, high-quality childcare—would have a positive effect on fertility (Rindfuss and Brewster 1996). In fact, many of the subsidized ECC policies in North America and Europe were implemented in the hopes that such family policies would reverse the trend of low fertility in these countries. In most cases, the actual impact of childcare policies on fertility levels has been disappointing, yielding either no effects or only small positive effects (Bick 2016; Castles 2003; DiPrete et al. 2003; Gauthier 2007; Hank and Kreyenfeld 2003; Kalwij 2010; Ronsen 2004). Furthermore, the theoretical impact of childcare subsidies in high-fertility contexts is ambiguous. The positive price effect on desired fertility may be offset by the negative opportunity costs of having children if subsidized childcare increases mothers' employment opportunities outside the home. Indeed, the increased opportunity costs of mothers' time through increased female employment is believed to be one of the key drivers of fertility decline in developing countries (Bulatao and Lee 1983; Van den Broeck and Maertens 2015).

Our study sheds light on these debates by offering the first rigorous analysis of the impact of subsidized daycare on WEE in sub-Saharan Africa. Specifically, we implemented a randomized control trial that offered poor urban mothers in Nairobi, Kenya, access to subsidized center-based childcare for one year. Our study makes three main contributions. First, by testing the impact of subsidized childcare on women's engagement in paid work, we challenge the widespread perception that due to greater work compatibility or availability of female kin, childcare obligations do not curtail African women's employment. Second, we assess whether reducing women's childcare burdens affects other aspects of WEE, such as women's time spent working, earnings, type of work, and autonomy. Last, we examine whether provision of childcare alters women's fertility intensions.

Previous Research on Subsidized Childcare and WEE

The effect of affordable ECC on WEE is the topic of extensive research and frequently elicits vigorous policy debates in high-income countries. Standard economic theory suggests that by reducing a mother's reservation wage, subsidized ECC should increase

maternal employment. The large majority of studies from North America and Europe have found results consistent with this theory, showing a strong negative association between the cost of childcare and maternal employment (Baker et al. 2008; Brilli et al. 2016; Fortin et al. 2012; Geyer et al. 2014; Gong et al. 2010; Haeck et al. 2015; Lefebvre and Merrigan 2008), although a few studies found that these effects are small (Havnes and Mogstad 2011; Lundin et al. 2008). The benefits of subsidized ECC are often concentrated among more-disadvantaged mothers. In particular, multiple studies have found that the overall gains are driven by significantly higher employment rates among single mothers (Cascio 2009; Doiron and Kalb 2005; Fitzpatrick 2012; Goux and Maurin 2010).

Over the last two decades, researchers and policy-makers from Latin America and Asia have joined these discussions as interest in expanding access to subsidized ECC in these regions mounts (Angeles et al. 2012; Barros et al. 2011; Berlinski and Galiani 2007; Calderon 2012; Jain 2016). Several studies echoed findings from Europe and North America, showing positive associations between affordable childcare and maternal employment in Argentina (Berlinski et al. 2011), China (Du and Dong 2013), Colombia (Attanasio and Vera-Hernández 2004), and Ecuador (Rosero and Oosterbeek 2011).

Some of these studies have also examined other aspects of WEE, such as the number of hours worked or total income earned (Angeles et al. 2012; Attanasio and Vera-Hernández 2004; Barros et al. 2011; Calderon 2012; Du and Dong 2013; Quisumbing et al. 2007; Rosero and Oosterbeek 2011). If subsidized ECC increases maternal employment, then both the total number of hours worked and total earnings should, presumably, rise among all mothers. Yet, this relationship is more complicated given that reduced childcare costs may influence both hours worked and types of jobs (Todd 2013). Assuming that leisure is a normal good and that mothers' wages stay constant, then reducing the cost of ECC would allow women to work fewer hours at an unchanged level of consumption. Furthermore, because center-based care is usually provided for 40 hours per week, subsidized care may encourage mothers to work up to this threshold but not beyond. In addition, mothers with subsidized childcare may seek better-paid jobs (i.e., higher hourly earnings) with more regular hours, even if such jobs are not compatible with childcare. In contrast, mothers who do not have access to affordable center-based childcare may prefer to work longer hours in lower-paid jobs with more flexible schedules to facilitate their simultaneous childcare responsibilities. Hence, the impact of subsidized ECC on either maternal hours or earnings is ambiguous.

Last, access to affordable childcare may impact other WEE dimensions, such as women's autonomy. In principle, greater engagement in paid work and increased earnings would bolster women's autonomy by giving them a greater stake in household decisions. To our knowledge, no previous studies have examined the impact of center-based childcare on measures of women's autonomy and decision-making.

Daycare Use in Africa

Rigorous studies examining the relationship between subsidized childcare and WEE in Africa are lacking. A recent systematic review of center-based childcare in developing

countries failed to identify a single study on this topic in Africa (Brown et al. 2014). Nonetheless, a few pertinent studies have indirectly suggested that subsidizing childcare would have little impact on women's employment for the reasons articulated earlier. A study in Accra, Ghana, found no significant association between the price or proximity of local childcare and women's employment, leading the authors to suggest that urban Ghanaian women can easily combine their childcare with their work in the informal sector (Quisumbing et al. 2007). Another unpublished study in rural Mozambique was designed to study the impact of preschools on children's cognitive development, not WEE. Nonetheless, it reported that the expansion of preschools did not increase maternal employment, potentially reflecting the reliance of working rural mothers on other female kin for childcare (Martinez et al. 2012).

This dearth of research on the impact of center-based childcare on WEE does not reflect the absence of such services. On the contrary, as in other developing regions, there has been a virtual explosion of center-based childcare across sub-Saharan Africa over the past two decades (Samman et al. 2016). In one peri-urban area of Nairobi, more than 80 % of children aged 3 to 6 were enrolled in an ECC center (Bidwell and Watine 2014). Nearly all these children (94 %), however, attended private ECC centers that charged a user fee. Although these fees are often not very large, previous studies have suggested that these costs prohibit at least some parents from sending their child to daycare centers (Lokshin et al. 2000; Murungi 2013). Concerns about the quality of care may also be a factor. For example, some Kenyan mothers expressed reluctance to send their children to centers after hearing reports of unsanitary conditions; minimal food provision; limited educational materials; and, in extreme cases, neglect and abuse (Githinji and Kanga 2011). To date, most African governments, including Kenya, have focused on improving and regulating the quality of private center-based care rather than providing public or subsidized ECC services (Adams 2009; Adams and Swadener 2000; Belfield 2007; Githinji and Kanga 2011).

Study Site

Our study was conducted in Korogocho, one of the informal settlement areas which are home to more than one-half of Nairobi residents (UN Habitat 2014). Informal settlements will play a pivotal role in absorbing the nearly 3 billion additional people expected to live in Africa by the end of the century (Gerland et al. 2014). Identifying effective strategies for promoting WEE in these types of settings is therefore critical. Although many women move to these urban areas looking for better-paying work, only 48.3 % of women were working in 2012 (African Population and Health Research Center (APHRC) 2014). Most jobs available to poor urban women are low-skilled, unstable, and poorly paid. Some of these jobs—such as selling food and goods at local markets, or washing laundry—may be compatible with simultaneous childcare; but other, more formal jobs in the service sector—such as teaching or working in a hotel or restaurant—are not (Clark et al. 2018). Furthermore, poor urban women may receive limited kin support. A recent study in Korogocho found that even among single mothers, who are presumably most dependent on kin support, more than 30 % did not receive childcare assistance from any kin member (Clark et al. 2017).

Data and Methods

Analytic Sample

Our sampling frame used data from the Nairobi Urban Health and Demographic Surveillance System collected between April and May 2015 to identify 1,928 mothers with at least one child aged 1 to 3 years (inclusive) at the time of enumeration. Of the mothers identified, 706 were excluded because they had moved or their child was outside the eligible age range by the time the baseline survey was conducted between August and October 2015.[2] The baseline survey interviewed a total of 1,222 women about their current childcare arrangements, economic activity, child health and well-being, and other sociodemographic characteristics. In this study, we exclude 30.5 % of mothers (n = 373) who were using an eligible daycare facility for at least one of their eligible children because they were not randomly assigned a new daycare at the individual level.[3] As anticipated, mothers with greater economic empowerment (i.e., working mothers, those with higher education, and those who participated in more household decisions) were more likely to be using center-based childcare at baseline. Kikuyu women were also more likely than women from other ethnic groups to pay for daycare. Having more children under age 5 was associated with lower use of formal childcare services (analyses available upon request). Hence, although the study arm assignment was not associated with eligible daycare use at baseline, it is important to bear in mind that our results pertain to more disadvantaged women, who are less inclined to pay for private daycare. Our analytic sample of 849 mothers includes those using ineligible childcare services (about 10 % of mothers), including those paying for childcare at informal centers or receiving free childcare.

One year later, between August and October 2016, we conducted an endline interview with 738 (87 %) of these mothers. Most mothers who were not interviewed had moved away (n = 87), a few were not located (n = 18), one mother died, and five refused to be reinterviewed.[4] Further analyses indicate significant differences between women who were lost to follow-up and those who were reinterviewed. Most importantly, attrition rates were higher among mothers in the control group (16.6 %) than those in the intervention arms (9.8 %). In addition, mothers who were lost to follow-up tended to be slightly younger, more educated, and a member of an ethnic group other than Kikuyu. There is no evidence of selective attrition with respect to our outcome variables (employment, hours, income, autonomy, or fertility intentions) or other baseline characteristics. Data analyzed in the current study are available from the corresponding author on reasonable request.

[2] Children who were age 4 at the time of the baseline survey were included as long as they were under age 4 at the time of enumeration.

[3] Mothers already using an eligible daycare were given vouchers for that center, resulting in randomization at the level of the daycare rather than individual.

[4] Five mothers whose eligible child died before endline were reinterviewed and retained in our analyses. Removing these mothers has no appreciable effect on our results.

Study Design and Intervention

An exhaustive inventory of existing ECC facilities in Korogocho identified 48 well-established and registered daycare centers. An additional 11 childcare facilities were deemed ineligible because they were either too small (caring for fewer than 10 children) or were sponsored by faith-based or community-based organizations that offered free services. The 48 daycare centers were stratified by village and then randomly assigned into one of three study arms, yielding 15 control centers (C), 16 regular centers offering vouchers (VR), and 17 quality-improved centers with vouchers (VQ). The VR and VQ centers accepted monthly vouchers from women assigned to their centers and were compensated for these vouchers directly by the project. They also received some unrestricted funds (equivalent to US$50) to help them accommodate potentially higher numbers of children owing to the intervention. Daycares assigned to the VQ arm were given additional training for their caregivers on early childhood development by the Aga Khan Foundation, and were provided with materials such as mattresses, potties, toys, and hand-washing stations.

Mothers who were not using one of these 48 eligible daycare centers at baseline were randomized at the individual level into one of the three arms of the study. A total of 280 mothers were assigned to the control arm (C). Mothers assigned to the voucher arm at regular centers (n = 284) selected among the 16 VR centers and those assigned to the voucher-plus-quality arm (n = 285) chose among the 17 VQ centers. Mothers were given 12 monthly vouchers, covering January to December 2016, for all their children aged 1 to 3.[5] For further details about the sample selection and randomization process, see Clark et al. (2016). Ethical clearance to conduct the study was obtained from McGill University and the African Medical and Research Foundation. Informed consent was obtained from all mothers.

Measures

Dependent Variables

All outcomes were measured at both baseline and endline. With respect to our three measures of women's labor market outcomes, women provided information on up to three income-generating activities in the last month. They were considered to be employed if they engaged in at least one income-generating activity (including self-employment). We obtained the number of hours worked by summing all reported hours across the three activities. Mother's monthly income is the sum of both cash and in-kind contributions (which were minimal) across all three activities. Given that income is known to be reported with considerable measurement error and prone to outliers, we trimmed the top 1 % of earnings (Deaton 1997; Glewwe 2007). In our analyses of *all mothers,* unemployed mothers are assumed to have worked 0 hours and earned 0 income.

[5] The intervention was deliberately extended two to four months beyond the endline survey to minimize the effect of mothers' anticipating the end of the daycare subsidies.

In addition, the survey asked about women's participation in five key decisions pertaining to household finances, major household purchases, children's health care, children's schooling, and childcare. We constructed an autonomy index by summing across all decisions in which women participated (either alone or with their partners). Analyses of each decision separately yielded no significant findings with the exception of children's health care. We therefore present results for children's health care and the autonomy index only. Last, to measure women's fertility intentions, we created a dichotomous variable to indicate whether they wanted to have more children.

Intervention Variables

To assess the impact by the original study arms, we first created a dichotomous variable indicating whether a mother was assigned to receive a voucher in either of the two intervention arms (*Voucher*) or the control group (*C*). We then examined differences between the two intervention arms using a categorical variable that separated mothers who received vouchers to regular daycares (*VR*) and mothers who received vouchers for improved-quality daycares (*VQ*) (with the control group remaining as the reference category).

Study arm assignment, however, does not necessarily indicate actual daycare use. During the study period, many mothers in the control arm of the study began paying for childcare services, and some mothers who were given vouchers chose not to use them. In addition, about 10 % of mothers in our sample sent at least one child to a daycare that did not meet the eligibility criteria or was located outside Korogocho. To test for the effects of actual daycare use, we created an indicator variable for whether mothers were using any daycare services (*DC*).

Control Variables

In our adjusted models, we controlled for important mother and household characteristics at baseline, including mothers' age, education, and ethnicity. Of particular interest is whether single mothers behave differently from married mothers. Hence, all models included a dummy variable for marital status, and some models also include an interaction term between marital status and our intervention variable (*Voucher*). In addition, because women's fertility influences their need for center-based ECC, we included variables for whether the mother was pregnant and her total number of children under age 5. To account for possible variation in the availability of childcare from kin, we measured whether any other females older than age 10 were living in the household and whether mothers moved to the study site in the last five years. Following Filmer and Pritchett (2001), we used principal component analysis to create a household wealth index based on household amenities and ownership of 21 common household assets. For the 6 % of households (n = 73) that were missing information on at least one of these items, we imputed the mean wealth asset score. Last, dummy variables for each of the seven villages in Korogocho were included to control for fixed village-level characteristics.

Identification Strategy

Our analyses largely followed those specified in the pre-analysis plan registered at https://www.socialscienceregistry.org/trials/843 (ID: AEARCTR-0000843).[6] The identification strategy relied on the random assignment of mothers to either the control group (*C*) or one of the two treatment groups (*Voucher*) at the individual level. We began by ascertaining whether our intervention affected our key mechanism by testing whether mothers who received a voucher to either type of daycare facility (*Voucher*) were, in fact, more likely to use daycare (*DC*) at endline than mothers who did not (Eq. (1)):

$$DC_i = \beta_0 + \beta_1 Voucher_i + \varepsilon_i. \tag{1}$$

Next, we included a vector (**X**) of the baseline mother and household characteristics to minimize differences across study arms, which may exist despite random selection or be introduced through the process of selective attrition. To further reduce variability, we included the lagged (baseline) dependent variable (Eq. (2)):

$$DC_i = \beta_0 + \beta_1 Voucher_i + \mathbf{X}_i\boldsymbol{\beta}_x + \varepsilon_i. \tag{2}$$

We then tested whether mothers with vouchers for improved-quality daycares (*VQ*) were more likely than mothers with vouchers for regular daycares (*VR*) to send their children to daycare (Eq. (3)):

$$DC_i = \beta_0 + \beta_1 VR_i + \beta_2 VQ_i + \mathbf{X}_i\boldsymbol{\beta}_x + \varepsilon_i. \tag{3}$$

After confirming no differences in their proclivity to use daycare, regardless of whether mothers were given vouchers for regular or quality-improved centers, we focused our subsequent analyses on the combined measure of *Voucher*.

In our basic intent-to-treat (ITT) model, we first regressed our outcome (*Y*) measures at endline on assignment to receive a voucher (*Voucher*). In our next model, we included a vector (**X**) of the baseline characteristics and lagged dependent variable (Eq. 4):

$$Y_i = \beta_0 + \beta_1 Voucher_i + \mathbf{X}_i\boldsymbol{\beta}_x + \varepsilon_i. \tag{4}$$

In our third ITT model, we included an interaction term between single motherhood and *Voucher* to examine whether the effects of the intervention differ for married and unmarried mothers.

Last, to examine the impact on mothers who used any daycare service, we estimated a treatment-on-treated (TOT) model. Our TOT model is identical to our ITT Eq. (4) except that we focused on the endogenous indicator of whether mothers used any

[6] The analyses presented deviate from the pre-analysis plan in two important respects. First, we do not show our results for the impact of subsidized childcare on *total household income* because these are similar to those for maternal income. Second, we do not present heterogeneity analyses for *migrant mothers* because there are no significant differences by migration status.

daycare services (*DC*) and instrumented this variable with our randomly assigned study arm variable (*Voucher*) using a two-stage least-squares procedure:

$$Y_i = \beta_0 + \beta_1 \widehat{DC_i} + \mathbf{X}_i \boldsymbol{\beta}_x + \varepsilon_i. \quad (5)$$

Following the standard practice of evaluating randomized controlled trial studies, we used OLS with robust standard errors for all models. Four types of sensitivity analyses were also conducted. First, we clustered at the village level to account for the possibility of correlated error terms among mothers living in closer proximity to one another. Second, we assessed the change between baseline and endline of our dependent variables. Third, we explored alternative regression methods. For our dichotomous outcomes (employment, child health decisions, and fertility intentions), we used probit analyses for the ITT regression and a bivariate probit for our TOT analysis (Lewbel et al. 2012).[7] Similarly, tobit analyses were used to account for left-censoring of mothers who were not working in our full sample analyses of number of hours worked and earned income. Fourth, to adjust for selective attrition on observable characteristics, we estimated the models using inverse probability weights (Wooldridge 2010). Inverse probability weights, which give larger weights to mothers who are more likely to be lost to follow-up, are estimated by predicting the probability of attrition based on a woman's baseline characteristics, including her study arm, employment status, autonomy index, and fertility intentions. Results from these sensitivity analyses are presented in Table A1 in the online appendix.

Results

Baseline Characteristics

Table 1 describes mother and household characteristics at baseline and tests for differences between the control and intervention arms. On average, mothers in our sample were nearly 29 years old and had eight years of education. More than 60 % had completed primary school, but only about 20 % had proceeded to secondary school. More than 40 % of mothers had more than one child under age 5 in the household. However, many mothers may have had access to supplemental childcare at home: 40 % coresided with at least one other female older than 10 years. The ethnic composition found in our sample reflects the national diversity. The largest group was Kikuyus (28 %), followed by Luo (24 %), Luhya (19 %), and Kamba (7 %). There was also a large Somali population (19 %).

Our randomization process ensured balance across most characteristics. Mothers who received a voucher, however, were less likely than those in the control group to have no education (11 % vs. 16 %). An *F* test assessing the joint significance of mothers' education categories found no statistical differences by study arm ($p = .17$), and average number of years of education did not vary by study arm. Mothers in the intervention group were also more likely than mothers in the control group to be

[7] Bivariate probit models assume that the error terms in both the first- and second-stage equations are jointly normal. According to Murphy's score test, this assumption was not violated (Murphy 2007).

Table 1 Baseline mother and household characteristics by study arm

	Total	Control	Voucher	*p* Value
N	849	280	569	
Intervention Variable				
Use any daycare	0.11	0.10	0.12	.54
	(0.02)	(0.02)	(0.01)	
Dependent Variables				
Employed	0.57	0.58	0.57	.65
	(0.02)	(0.03)	(0.02)	
Hours (per week)	40.16	41.64	39.42	.25
	(0.91)	(1.60)	(1.10)	
Income (per month)	4,778.08	4,823.23	4,755.23	.88
	(210.10)	(375.94)	(253.22)	
Autonomy score	3.76	3.76	3.76	1.00
	(0.05)	(0.08)	(0.06)	
Health decision	0.93	0.93	0.92	.63
	(0.01)	(0.02)	(0.01)	
Desire more children	0.43	0.44	0.42	.56
	(0.02)	(0.03)	(0.02)	
Independent Variables				
Age (years)	28.84	28.73	28.89	.70
	(0.23)	(0.40)	(0.28)	
Education (years)	7.97	7.74	8.08	.20
	(0.13)	(0.24)	(0.15)	
Education (level)				
None	0.13	0.16	0.11	.03
	(0.01)	(0.02)	(0.01)	
Some primary	0.25	0.23	0.26	.35
	(0.02)	(0.03)	(0.02)	
Completed primary	0.40	0.39	0.41	.64
	(0.02)	(0.03)	(0.02)	
Secondary or higher	0.22	0.21	0.22	.81
	(0.01)	(0.03)	(0.02)	
Currently unmarried	0.23	0.20	0.25	.14
	(0.01)	(0.02)	(0.02)	
Currently pregnant	0.06	0.04	0.07	.05
	(0.01)	(0.01)	(0.01)	
Number of children				
One	0.57	0.59	0.56	.40
	(0.02)	(0.03)	(0.02)	

Table 1 (continued)

	Total	Control	Voucher	*p* Value
Two	0.33	0.31	0.34	.33
	(0.02)	(0.03)	(0.02)	
Three or more	0.10	0.10	0.10	.88
	(0.01)	(0.02)	(0.01)	
Any older females	0.40	0.37	0.41	.25
	(0.02)	(0.03)	(0.02)	
Recent migrant	0.19	0.19	0.20	.79
	(0.01)	(0.02)	(0.02)	
Ethnicity				
Kikuyu	0.28	0.25	0.29	.15
	(0.02)	(0.03)	(0.02)	
Luo	0.24	0.24	0.23	.86
	(0.02)	(0.03)	(0.02)	
Luhya	0.19	0.20	0.18	.47
	(0.01)	(0.02)	(0.02)	
Kamba	0.07	0.05	0.08	.15
	(0.02)	(0.01)	(0.01)	
Somali	0.19	0.21	0.18	.18
	(0.03)	(0.03)	(0.02)	
Other	0.04	0.05	0.04	.51
	(0.01)	(0.01)	(0.01)	
Wealth quintiles				
First (poorest)	0.22	0.19	0.23	.22
	(0.01)	(0.02)	(0.02)	
Second	0.21	0.18	0.23	.11
	(0.01)	(0.02)	(0.02)	
Third	0.18	0.20	0.18	.39
	(0.01)	(0.02)	(0.02)	
Fourth	0.19	0.21	0.18	.27
	(0.01)	(0.03)	(0.02)	
Fifth (least poor)	0.19	0.21	0.18	.30
	(0.01)	(0.02)	(0.02)	
Village				
Gitathuru C	0.14	0.14	0.14	.88
	(0.01)	(0.02)	(0.01)	
Grogan A	0.08	0.08	0.08	.91
	(0.01)	(0.02)	(0.01)	
Grogan B	0.05	0.05	0.05	.96
	(0.01)	(0.01)	(0.01)	

Table 1 (continued)

	Total	Control	Voucher	*p* Value
Highridge	0.28	0.28	0.28	.98
	(0.02)	(0.03)	(0.02)	
Korogocho A	0.15	0.15	0.15	.97
	(0.01)	(0.02)	(0.02)	
Korogocho B	0.06	0.06	0.06	.96
	(0.01)	(0.01)	(0.01)	
Nyayo	0.24	0.24	0.24	.99
	(0.01)	(0.03)	(0.02)	

Notes: Standard errors are shown in parentheses. The last column shows *p* values obtained from *t* tests. Ethnicity and wealth quintiles do not total 100 % due to rounding.

pregnant at baseline (6 % vs. 4 %, respectively, $p = .05$). No statistically significant differences were found with respect to other control variables, including mothers' age, ethnicity, household wealth, household composition, and village.

In addition, we found no statistically significant differences for daycare use, with about 10 % of mothers in both study arms using an ineligible center for at least one of their children at baseline. We also found no significant differences at baseline with respect to the six outcomes or the type of work performed between the study arms. The majority of mothers in our sample (57 %) were working for pay. One-third of mothers (33.3 %) sold food or goods, typically as small-scale vendors in local markets. Other women provided cleaning services, often as part of a government-sponsored slum improvement program (30.9 %); washed laundry (14.9 %); or performed service jobs, such as teaching, hairdressing, and tailoring, or worked in hotels and restaurants (11.4 %). A small percentage of women engaged in other types of income-generating activities, such as processing at local factories or scavenging in a nearby dumpsite (6.4 %).

These employed mothers worked, on average, about 40 hours per week and earned slightly less than 5,000 Kenyan Shillings (KES) (about US$50) per month, roughly one-half of average household income. Mothers who were using daycare at baseline reported paying about 540 KES (about US$5.40) per month per child for daycare. Given that mothers have, on average, about 1.5 children under age 5, we estimate that childcare costs would consume about 17 % of working mothers' income. On average, women reported engaging in 3.8 of 5 main decisions. Most women (more than 90 %) participated in decisions about their children's health. Slightly less than one-half of women in our sample (43 %) wanted to have more children. Single mothers, who may face particular challenges in balancing paid work and childcare, represent almost one-quarter of our sample. The sociodemographic profiles of married and unmarried mothers also show striking differences. Importantly for the purposes of our study, single mothers were significantly more likely than married mothers to be working for pay at baseline (79 % vs. 50 %, respectively).

Daycare Use

We begin by investigating whether our intervention impacted our key mechanism, use of daycare. At endline, more than 80 % of mothers who were given vouchers were sending their children to daycare. Not all of this increase, however, can be attributed to the subsidy: more than one-half of mothers (57.6 %) in the control arm also sent their children to an ECC center. Much of this increase in daycare use reflects children getting older. Nonetheless, a nearly 25 percentage point difference (or 42.9 % increase) in daycare use remains between mothers given vouchers and those who were not given vouchers (Table 2, Model 1). Model 2 shows that controlling for baseline characteristics barely altered this difference. Importantly, the uptake rate did not differ between the two intervention arms (VR and VQ), indicating that mothers were not more likely to use vouchers for quality-improved centers (Model 3).

Maternal Employment

Table 3 examines the relationship between subsidized ECC and maternal employment. In Model 1, which shows unadjusted ITT results, we found that mothers who received a voucher were, on average, 8.5 percentage points more likely to be employed compared with mothers who did not receive a voucher (57.4 % vs. 48.9 %, respectively). This represents a 17.3 % increase in employment between mothers in the control and those in the intervention arms of our study. Adjusting for baseline characteristics (Model 2) reduced the difference to 7.4 percentage points, but it remained statistically significant. Sensitivity analyses yielded similar results, with estimates ranging from 6.7 % to 9.5 %, depending on the model specification (Table A1, online appendix).

Model 3, which tests for an interaction effect between marital status and study arm, shows that receiving a voucher significantly increased employment among married mothers by about 10 percentage points (46 % *C* vs. 56 % *Voucher*) but not among

Table 2 Mothers' use of daycare

	1	2	3
Voucher	0.247***	0.242***	
	(0.037)	(0.034)	
VR			0.249***
			(0.038)
VQ			0.236***
			(0.038)
Controls	No	Yes	Yes
Number of Observations	738	736	736
F Statistic	45.1	8.2	7.9

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. VR = voucher for regular daycare center, VQ = voucher for quality-improved daycare center. Robust standard errors are shown in parentheses.

***$p < .001$

Table 3 Effects of intervention and daycare use on maternal employment

	ITT[a]			TOT[b]
	1	2	3	4
Voucher/Daycare	0.085*	0.074*	0.099*	0.305*
	(0.040)	(0.035)	(0.040)	(0.147)
Unmarried		0.061	0.140*	0.057
		(0.043)	(0.069)	(0.043)
Unmarried × Voucher			–0.111	
			(0.080)	
Controls	No	Yes	Yes	Yes
Number of Observations	738	736	736	736
F Statistic/Wald Test	4.6	19.3	19.2	513.2

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. Robust standard errors are shown in parentheses.

[a] ITT = intent-to-treat.

[b] TOT = treatment-on-treated.

*$p < .05$

single mothers (60 % *C* vs. 59 % *Voucher*), who were substantially more likely to be employed at baseline. Consequently, in the control arm of the study, single mothers were 14 percentage points more likely to be employed than married mothers, but the employment gap between married and unmarried mothers who received vouchers shrunk to 3 percentage points and is insignificant.

Not surprisingly, the effects of actual daycare use (TOT) are even stronger. Adjusting for baseline characteristics, Model 4 shows that women who used daycare were 30.5 percentage points more likely to be employed than those who did not. This represents a twofold increase in the likelihood of being employed among mothers using daycare compared with non-users. However, in our adjusted bivariate model (online appendix, Table A1, Model 4), our estimate fell to 15.2 percentage points (or only a 56 % increase). Hence, although these effects remained significant, the magnitude of the effect is sensitive to specification. These analyses suggest that subsidizing daycare is an effective means of increasing employment for married women in this poor urban setting.

Number of Hours Worked

We next examined the relationship between subsidized daycare and number of hours worked. Because mothers in the *Voucher* group were more likely to be employed than those in the control arm, one may expect that the total number of hours worked would be significantly higher for mothers who were given vouchers. The top panel of Table 4, however, reveals that this is not the case. The average number of hours worked by

Table 4 Effects of intervention and daycare use on number of hours worked per week

	ITT[a]			TOT[b]
	1	2	3	4
All Mothers				
Voucher/daycare	1.28	1.31	4.25†	5.46
	(2.20)	(2.00)	(2.21)	(8.18)
Unmarried		–1.00	8.19†	–1.11
		(2.50)	(4.54)	(2.46)
Unmarried × Voucher			–13.04**	
			(4.91)	
Controls	No	Yes	Yes	Yes
Number of observations	736	732	732	732
F statistic/Wald test	0.3	12.6	12.8	357.6
	ITT[a]			TOT[b]
	5	6	7	8
Employed Mothers				
Voucher/daycare	–4.85*	–6.04*	–2.55	–22.61*
	(2.45)	(2.82)	(3.38)	(11.17)
Unmarried		–3.50	3.58	–4.03
		(2.75)	(5.07)	(2.83)
Unmarried × Voucher			–10.01†	
			(5.56)	
'Controls	No	Yes	Yes	Yes
Number of observations	402	293	293	293
F statistic/Wald test	3.9	3.0	3.2	76.5

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. Robust standard errors are shown in parentheses.

[a] ITT = intent-to-treat.

[b] TOT = treatment-on-treated.

†$p < .10$; *$p < .05$; **$p < .01$

mothers who were given vouchers was no greater than their control counterparts. These results hold across all our sensitivity analyses (Table A1). Furthermore, mothers who used daycare did not work significantly longer hours than non-users (Model 4).

Interaction analyses, which explore differences between single and married mothers, help explain this finding (Model 3). Among married mothers, whose employment rate increased significantly, total number of hours worked also increased by 4.25 hours per week, as expected. In contrast, single mothers who received a voucher reduced their weekly work time by 8.8 hours, despite no difference in the employment rate between unmarried women in the control and intervention arms of the study.

To further investigate this finding, in the bottom panel of Table 4, we consider mothers who were employed at endline. In this self-selected sample, mothers who

received the vouchers worked significantly fewer hours than mothers in the control group. The effect size is nearly five hours per week in the unadjusted model (Model 5) and more than six hours in the fully adjusted model (Model 6). As with our analyses of all mothers, Model 7 suggests that this reduction in working hours is concentrated among single mothers. Employed single mothers who were given vouchers worked, on average, 12.6 fewer hours than those who were not given vouchers, whereas employed married mothers reduced their time spent working by only 2.6 hours. Using daycare was associated with working more than 20 fewer hours per week, cutting the average work week by more than half (Model 8).

Effects on Maternal Income

Table 5 examines the relationship between subsidized ECC and mothers' earnings. Although mothers receiving vouchers were more likely to be employed, they were not working longer hours. It is, therefore, ambiguous whether their earned income would be greater or similar to mothers who did not receive vouchers. The top panel of Table 5 shows that on average, mothers with vouchers earned 619 more KES (more than US$6.00) per month (Model 1) equivalent to an increase in earnings of 24 % of the baseline 2,600 KES. After adjusting for women's characteristics, the difference in earnings falls slightly to 555 KES and remains significant (Model 2). Sensitivity analyses presented in Table A1 (online appendix) show a similar impact of the vouchers on women's monthly earnings. We found no significant differences in the earnings of married and unmarried mothers who received the vouchers despite our finding in Table 4 that single mothers with vouchers worked significantly fewer hours per week (Model 3). Further analyses (not shown) controlling for total number of hours worked confirmed that single mothers who received vouchers managed to increase their hourly earnings. The TOT estimates point to a large difference in earnings between mothers who used daycare and non-users (Model 4). Mothers who used daycare earned 2,373 KES more than those not using daycare, representing a difference of nearly one-half the average earnings for employed mothers.

Among the sample of mothers who were employed at endline (bottom panel of Table 5), we found no significant differences in the monthly earnings. Although we acknowledge that this selected sample does not represent all mothers in Korogocho, these estimates nonetheless suggest that the higher earnings among intervention mothers is primarily driven by their higher employment levels. They also reveal the somewhat counterintuitive finding that despite working nearly five fewer hours per week, employed mothers who received vouchers did not earn less income than mothers in the comparison group (Models 5 and 6). Model 7 further shows no differences between employed married and unmarried mothers' earnings despite our prior finding that single mothers with vouchers worked fewer hours. Even in our TOT analyses (Model 8), we found that although mothers who used daycare worked 22 fewer hours per week, they did not earn less money. In fact, the coefficient is positive and large, but not significant.

Results presented in Tables 4 and 5 raise questions as to how women, particularly single mothers, are able to work fewer hours without any loss of income (i.e., increase their hourly earnings). Descriptive analyses of the four most common types of work women perform by marital status and study arm offer some insights. Figure 1 shows

Table 5 Effects of intervention and daycare use on earned income in KHS per month

	ITT[a]			TOT[b]
	1	2	3	4
All Mothers				
Voucher/daycare	619*	555*	525†	2,373*
	(271)	(252)	(279)	(1,093)
Unmarried		114	19	53
		(374)	(572)	(380)
Unmarried × Voucher			134	
			(651)	
Controls	No	Yes	Yes	Yes
Number of observations	733	730	730	730
F statistic/Wald test	5.2	6.9	6.7	180.4
	ITT[a]			TOT[b]
	5	6	7	8
Employed Mothers				
Voucher/daycare	373	620	409	2,397
	(389)	(501)	(615)	(1,866)
Unmarried		–284	–716	–241
		(582)	(874)	(586)
Unmarried × Voucher			609	
			(995)	
Controls	No	Yes	Yes	Yes
Number of observations	399	293	293	293
F statistic/Wald test	0.9	1.4	1.3	37.5

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. Robust standard errors are shown in parentheses.

[a] ITT = intent–to-treat.

[b] TOT = treatment-on-treated.

†$p < .10$; *$p < .05$

that both single ($p = .066$) and married ($p = .067$) mothers with vouchers were more likely than their counterparts without subsidized childcare to provide cleaning services. These results were largely driven by women's participation in the government-run slum improvement program, which required 40 hours of cleaning per week. Single mothers with vouchers also increased their participation in the service sector (including teaching, hairdressing, and employment in a hotel or restaurant) ($p = .047$) and decreased their engagement in washing laundry ($p = .058$). These findings suggest that access to subsidized ECC, which is usually fixed at 40 hours per week, encouraged women, especially single mothers, to shift from jobs with more flexible hours that are more compatible with simultaneous childcare (i.e., laundry and small-scale vending) to jobs

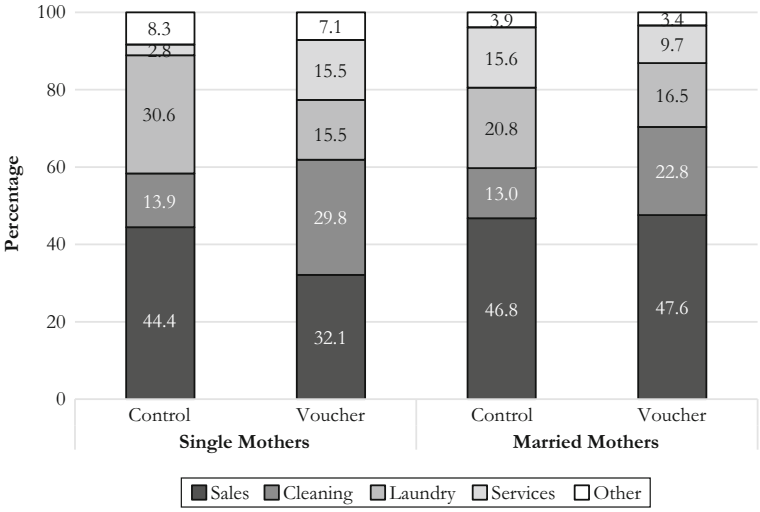

Fig. 1 Type of job by marital status and study arm.

with more fixed hours, which may be more difficult to combine with childcare (i.e., employment in the service sector or government-sponsored programs).

Women's Autonomy

Beyond improving employment, WEE can be advanced by enhancing women's agency in key household decisions (Kabeer 1999). With respect to our overall autonomy index, Table 6 provides no evidence that women who were given vouchers had greater agency despite higher levels of employment (Models 1 and 4). Single mothers were much more likely than married mothers to make decisions, but this likely reflects the absence of adult men in these households (Model 2). Even among married mothers, access to subsidized ECC did not appear to increase their overall participation in household decision making (Model 3).

These findings were confirmed by subsequent analyses of each of the five decisions separately (results not shown). The only dimension of autonomy for which our analysis found that intervention mothers demonstrated greater agency than control mothers was with respect to children's health care (bottom panel of Table 6). Mothers who received access to subsidized ECC were 6.8 percentage points more likely to make decisions about their children's health (Model 5), and mothers who used daycare were 27.4 percentage points more likely than non-users to be involved in such decisions (Model 8). We found no differences, however, by marital status in the effects of subsidized ECC (Model 7).

Fertility Intentions

In our final set of analyses, we assessed the effect of subsidized childcare on women's fertility intentions (Table 7). We found no evidence in any model that access to subsidized ECC increased women's desire to have additional children, regardless of women's marital status. Additional analyses (not shown) also failed to detect any

Table 6 Effects of intervention and daycare use on measures of women's autonomy

	ITT[a]			TOT[b]
	1	2	3	4
Automony Index				
Voucher/daycare	0.030	–0.014	–0.010	–0.058
	(0.118)	(0.105)	(0.119)	(0.427)
Unmarried		0.270*	0.281	0.270*
		(0.125)	(0.226)	(0.123)
Unmarried × Voucher			–0.015	
			(0.255)	
Controls	No	Yes	Yes	Yes
Number of observations	738	736	736	736
F statistic/Wald test	0.8	9.3	9.0	261.0
	ITT[a]			TOT[b]
	5	6	7	8
Health Decisions				
Voucher/daycare	0.068**	0.067**	0.062*	0.274**
	(0.024)	(0.023)	(0.027)	(0.010)
Unmarried		–0.007	–0.022	–0.015
		(0.023)	(0.051)	(0.026)
Unmarried × Voucher			0.022	
			(0.056)	
Controls	No	Yes	Yes	Yes
Number of observations	735	732	732	732
F statistic/Wald test	8.1	2.0	2.0	42.8

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. Robust standard errors are shown in parentheses.

[a] ITT = intent–to-treat.

[b] TOT = treatment-on-treated.

*$p < .05$; **$p < .01$

significant differences in the number of additional children desired or in fertility behaviors, including new births and new pregnancies over the intervening year.

Discussion

This study shows that contrary to common perceptions, women's childcare responsibilities substantially inhibit their economic activity in a poor urban settlement in sub-Saharan Africa. Specifically, we investigate whether offering mothers subsidized ECC could be an effective strategy to increase their employment and enhance their economic empowerment more broadly. Our study reveals a very high demand for subsidized ECC

services. Uptake among mothers who were given subsidized daycare was 42.9 % higher, resulting in more than 80 % of mothers in the intervention arm using daycare services. Although these findings indicate that user costs prevent women from using daycare services, we find that the quality of childcare had no effect on use. These findings do not necessarily indicate that quality of care does not matter, particularly for child outcomes (Martinez et al. 2012). In fact, both mothers and care providers repeatedly stressed the importance of safety, health, and educational training. However, mothers in this context, like parents elsewhere, may not be aware of or able to perceive differences in quality among centers (Blau 2001). Hence, in this context, user cost appears to be the larger barrier to accessing formal childcare.

Removing this barrier could significantly increase maternal employment. Consistent with our expectations, we find that mothers who were given vouchers for daycare were 8.5 percentage points (or 17.3 %) more likely to be employed than mothers who were not given vouchers. Hence, in Kenya, where men are 10 percentage points more likely to participate in the paid labor force than women (World Bank 2017), providing subsidized childcare could largely close this gender gap. For mothers who actually used daycare services, this effect rose to more than 30 percentage points.

These findings counter widespread arguments that mothers' childcare responsibilities in sub-Saharan Africa do not impede their labor force participation either because they can easily combine childcare and work or because there is a surplus of female kin available for free childcare. In fact, our results are remarkably consistent with previous studies in other regions (Angeles et al. 2012; Baker et al. 2008; Brilli et al. 2016; Calderon 2012; Geyer et al. 2014). However, unlike prior studies (Cascio 2009; Doiron and Kalb 2005; Goux and Maurin 2010), we find that married mothers, rather than single mothers, are the primary beneficiaries of subsidized ECC with respect to

Table 7 Effects of intervention and daycare use on women's fertility intensions

	ITT[a]			TOT[b]
	1	2	3	4
Voucher/Daycare	0.018	0.035	0.013	0.145
	(0.040)	(0.032)	(0.036)	(0.131)
Unmarried		–0.027	–0.096	–0.030
		(0.043)	(0.069)	(0.042)
Unmarried × Voucher			0.097	
			(0.081)	
Controls	No	Yes	Yes	Yes
Number of Observations	738	736	736	736
F statistic/Wald test	0.7	23.4	22.8	636.2

Notes: Control variables include mothers' age, education, ethnicity, marital status, pregnancy status, number of young children, migrant status, household wealth, older females, village, and a lagged dependent variable. Robust standard errors are shown in parentheses.

[a] ITT = intent-to-treat.

[b] TOT = treatment-on-treated.

employment. This finding may reflect the fact that most single mothers (79 %) were already employed at baseline.

In contrast, single mothers benefited with respect to other dimensions of WEE. Single mothers with access to affordable childcare were able to increase their leisure time without reducing their earnings. Descriptive analyses suggest that they achieved this by shifting from jobs with more flexible hours to jobs with fixed hours, which may be less compatible with simultaneous childcare but also pay better. Formal childcare may also enable mothers to work more productively: qualitative interviews with mothers in Korogocho indicated that many mothers who simultaneously juggled childcare and work felt chronically distracted and noted numerous interruptions (Clark et al. 2018).

We also found that both married and unmarried mothers who had access to affordable ECC were more likely to make decisions about their children's health care. It is possible that mothers may be receiving information about children's health care from daycare providers, who often share best practices and report health issues to parents. Alternatively, employed mothers may be more proactive about their children's health. This mechanism is consistent with another study in Nairobi, showing that working mothers were more likely than nonworking mothers to use health facilities when their child was ill (Taffa et al. 2005). Nonetheless, mothers who received subsidized ECC did not report higher levels of autonomy with respect to any other important household decision, highlighting that women's employment does not necessarily enhance all dimensions of WEE (Laszlo et al. 2017).

Last, we found no evidence that reducing the cost of raising children increased women's desires to have more children. These findings are far from definitive, given that our intervention lasted only one year and the impact on both fertility intentions and behaviors may be stronger over the longer term. Nonetheless, they provide some assurance that the initial effects on fertility intentions are not large and immediate. They also highlight the possibility that subsidized ECC—perhaps paired with more traditional WEE programs, such as microcredit provision or skills training—could substantially increase women's employment, ultimately reducing fertility rates in Africa.

Women in sub-Saharan Africa are likely to face a growing conflict between childcare and paid work responsibilities. Such challenges may be especially acute in Africa's growing slum areas, where mothers reside far from their extended kinship networks. Subsidized ECC can help overcome this challenge and mitigate the consequences of gender inequalities in childcare responsibilities. Studies from high-income countries further suggest that subsidized ECC is cost-effective, with the benefits reaped through increased maternal employment and human capital development far outweighing the costs (Fortin et al. 2012; García et al. 2016; Lefebvre et al. 2009). Although careful cost-benefit analyses have not been conducted in sub-Saharan Africa, the comparatively low costs of ECC (less than $5 per month), coupled with its significant impact on women's employment, suggests that subsidized childcare could be a highly effective strategy for promoting WEE and fostering broader economic development goals.

Acknowledgments This work was carried out with financial support under the Growth and Economic Opportunities for Women (GrOW) initiative. GrOW is a multi-funder partnership with the UK Government

Department for International Development, the William and Flora Hewlett Foundation, and the International Development Research Centre, Canada. Valuable research assistance was provided by Jan Cooper, Madeleine Henderson, and Natalie Simeu at McGill University. Milka Wanjohi, APHRC, contributed expert field support and management. The Nairobi Urban Health and Demographic Surveillance System has received support from a number of donors, including the Rockefeller Foundation (United States), the Wellcome Trust (UK), the William and Flora Hewlett Foundation (United States), Comic Relief (UK), the Swedish International Development Cooperation (SIDA), and the Bill and Melinda Gates Foundation (United States). Writing time for coauthors from the African Population and Health Research Center was partially covered with a general support grant from the William and Flora Hewlett Foundation (Grant 2015-2530).

References

Adams, D. (2009). Education for all: A contrasting analysis of preschool policies. *International Critical Childhood Policy Studies Journal, 2,* 43–59.

Adams, D., & Swadener, B. B. (2000). Early childhood education and teacher development in Kenya: Lessons learned. *Child & Youth Care Forum, 29,* 385–402.

African Population and Health Research Center (APHRC). (2014). *Population and health dynamics in Nairobi's informal settlements: Report of the Nairobi Cross-sectional Slums Survey* (NCSS report). Nairobi, Kenya: APHRC.

Angeles, G., Gadsden, P., Galiani, S., Gertler, P., Herrera, A., Kariger, P., & Seira, E. (2012). *The impact of day care on maternal labour supply and child development in Mexico* (3ie Grantee final report). Cuernavaca, Mexico: Instituto Nacional de Salud Pública, Centro de Investigación en Evaluación y Enquestas.

Attanasio, O., & Vera-Hernández, M. (2004). *Medium-and long run effects of nutrition and child care: Evaluation of a community nursery programme in rural Colombia* (Working Paper EWP04/06). London, UK: Centre for the Evaluation of Development Policies, Institute for Fiscal Studies.

Baker, M., Gruber, J., & Milligan, K. (2008). Universal child care, maternal labor supply, and family well-being. *Journal of Political Economy, 116,* 709–745.

Barros, R., Olinto, P., Lunde, T., & Carvalho, M. (2011, March). *The impact of access to free childcare on women's labor market outcomes: Evidence from a randomized trial in low-income neighborhoods of Rio de Janeiro.* Paper prepared for the 2011 World Bank Economists' Forum, Washington, DC.

Belfield, C. (2007). *Financing early childhood care and education: An international review* (Education for All Global Monitoring report). Paris, France: UNESCO.

Berlinski, S., & Galiani, S. (2007). The effect of a large expansion of pre-primary school facilities on preschool attendance and maternal employment. *Labour Economics, 14,* 665–680.

Berlinski, S., Galiani, S., & Mc Ewan, P. J. (2011). Preschool and maternal labor market outcomes: Evidence from a regression discontinuity design. *Economic Development and Cultural Change, 59,* 313–344.

Bick, A. (2016). The quantitative role of child care for female labor force participation and fertility. *Journal of the European Economic Association, 14,* 639–668.

Bidwell, K., & Watine, L. (2014). *Exploring early education problems in peri-urban settings in Africa: Final report*. Newhaven, CT: Innovations for Poverty Action.

Blau, D. (2001). *The child care problem: An economic analysis*. New York, NY: Russell Sage Foundation.

Brilli, Y., Del Boca, D., & Pronzato, C. D. (2016). Does child care availability play a role in maternal employment and children's development? Evidence from Italy. *Review of Economics of the Household, 14,* 27–51.

Brown, T. W., van Urk, F. C., Waller, R., & Mayo-Wilson, E. (2014). Centre-based day care for children younger than five years of age in low- and middle-income countries. *Cochrane Database of Systematic Reviews, 2014*(9), 1–52. https://doi.org/10.1002/14651858.CD010543.pub2

Bulatao, R. A., & Lee, R. D. (Eds.). (1983). *Determinants of fertility in developing countries, Vol. 1: Supply and demand for children*. New York, NY: Academic Press.

Calderon, G. (2012). *What is good for the goose is good for the gander: The effects of child care provision in Mexico.* Unpublished manuscript, Freeman Spogli Institute for International Studies, Stanford University, Stanford, CA.

Cascio, E. (2009). Maternal labor supply and the introduction of kindergartens into American public schools. *Journal of Human Resources, 44,* 140–170.

Cassirer, N., & Addati, L. (2007). *Expanding women's employment opportunities: Informal economy workers and the need for childcare*. Geneva, Switzerland: ILO.

Castles, F. G. (2003). The world turned upside down: Below replacement fertility, changing preferences and family-friendly public policy in 21 OECD countries. *Journal of European Social Policy, 13,* 209–227.

Clark, S., De Almada, M., Kabiru, C. W., Muthuri, S., & Wanjohi, M. (2018). Balancing paid work and child care in a slum of Nairobi, Kenya: The case for center-based child care. *Journal of Family Studies*. Advance online publication. https://doi.org/10.1080/13229400.2018.1511451

Clark, S., Kabiru, C. W., Baruah, S., Muthuri, S., & Njeri, M. (2016). *Creating better economic opportunities for women in the Nairobi slums through improved child care options: Final report for Wave 1*. Unpublished manuscript, McGill University, Montréal, Canada.

Clark, S., Madhavan, S., Cotton, C., Beguy, D., & Kabiru, C. (2017). Who helps single mothers in Nairobi? The role of kin support. *Journal of Marriage and Family, 79,* 1186–1204.

Deaton, A. (1997). *The analysis of household surveys: A microeconometric approach to development policy.* Washington, DC: World Bank.

Díaz, M. M., & Rodriguez-Chamussy, L. (2016). *Cashing in on education: Women, childcare, and prosperity in Latin America and the Caribbean*. Washington, DC: International Bank for Reconstruction and Development/World Bank.

DiPrete, T. A., Morgan, P. S., Engelhardt, H., & Pacalova, H. (2003). Do cross-national differences in the costs of children generate cross-national differences in fertility rates? *Population Research and Policy Review, 22,* 439–477.

Doiron, D., & Kalb, G. (2005). Demands for child care and household labour supply in Australia. *Economic Record, 81*(254), 215–236.

Du, F., & Dong, X. Y. (2013). Women's employment and child care choices in urban China during the economic transition. *Economic Development and Cultural Change, 62,* 131–155.

Filmer, D., & Pritchett, L. (2001). Estimating wealth effects without expenditure data—or tears: An application to educational enrollment in states of India. *Demography, 38,* 115–132.

Fitzpatrick, M. D. (2012). Revising our thinking about the relationship between maternal labor supply and preschool. *Journal of Human Resources, 47,* 583–612.

Folbre, N. (2014). The care economy in Africa: Subsistence production and unpaid care. *Journal of African Economies, 23*(Suppl. 1), i128–i156.

Fortin, P., Godbout, L., & St-Cerny, S. (2012). *Impact of Québec's universal low fee childcare program on female labour force participation, domestic income, and government budgets* (Working Paper 2012: 02). Québec, Canada: The Research Chair in Taxation and Public Finance at the University of Sherbrooke.

Foster, G. (2000). The capacity of the extended family safety net for orphans in Africa. *Psychology, Health & Medicine, 5,* 55–62.

García, J. L., Heckman, J. J., Leaf, D. E., & Prados, M. J. (2016). *The life-cycle benefits of an influential early childhood program* (HCEO Working Paper Series No. 2016-035). Chicago, IL: Human Capital and Economic Opportunity Global Working Group.

Gauthier, A. (2007). The impact of family policies on fertility in industrialized countries: A review of the literature. *Population Research and Policy Review, 26,* 323–346.

Gerland, P., Raftery, A. E., Sevcíková, H., Li, N., Gu, D., Spoorenberg, T., . . . Wilmoth, J. (2014). World population stabilization unlikely this century. *Science, 346,* 234–237.

Geyer, J., Haan, P., & Wrohlich, K. (2014). *The effects of family policy on mothers' labor supply: Combining evidence from a structural model and a natural experiment* (Discussion Paper No. 1366). Berlin, Germany: German Institute for Economic Research.

Githinji, F. W., & Kanga, A. (2011). Early childhood development education in Kenya: A literature review on current issues. *International Journal of Current Research, 3*(11), 129–136.

Glewwe, P. (2007). Measurement error bias in estimates of income and income growth among the poor: Analytical results and a correction formula. *Economic Development and Cultural Change, 56,* 163–189.

Gong, X., Breunig, R. V., & King, A. (2010). *How responsive is female labour supply to child care costs: New Australian estimates* (Discussion Paper No. 5119). Bonn, Germany: Institute for the Study of Labor (IZA).

Goux, D., & Maurin, E. (2010). Public school availability for two-year olds and mothers' labour supply. *Labour Economics, 17,* 951–962.

Haeck, C., Lefebvre, P., & Merrigan, P. (2015). Canadian evidence on ten years of universal preschool policies: The good and the bad. *Labour Economics, 36,* 137–157.

Hank, K., & Kreyenfeld, M. (2003). A multilevel analysis of childcare and women's fertility decisions in Western Germany. *Journal of Marriage and Family, 65,* 584–596.

Havnes, T., & Mogstad, M. (2011). Money for nothing? Universal child care and maternal employment. *Journal of Public Economics, 95,* 1455–1465.

International Labor Organization (ILO). (2016). *Women at work: Trends 2016* (Report). Geneva, Switzerland: ILO.

Jain, M. (2016). Public pre-schooling and maternal labour force participation in rural India. *Oxford Development Studies, 44,* 246–263.

Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change, 30,* 435–464.

Kalwij, A. (2010). The impact of family policy expenditure on fertility in Western Europe. *Demography, 47,* 503–519.

Korotayev, A., Zinkina, J., Goldstone, J., & Shulgin, S. (2016). Explaining current fertility dynamics in tropical Africa from an anthropological perspective: A cross-cultural investigation. *Cross-Cultural Research, 50,* 251–280.

Laszlo, S., Grantham, K., Oskay, E., & Zhang, T. (2017). *Grappling with the challenges of measuring women's economic empowerment* (GrOW Research Series, Policy brief). Montréal, Canada: Institute for the Study of International Development, McGill University.

Lefebvre, P., & Merrigan, P. (2008). Child-care policy and the labor supply of mothers with young children: A natural experiment from Canada. *Journal of Labor Economics, 26,* 519–548.

Lefebvre, P., Merrigan, P., & Verstraete, M. (2009). Dynamic labour supply effects of childcare subsidies: Evidence from a Canadian natural experiment on low-fee universal child care. *Labour Economics, 16,* 490–502.

Leroy, J. L., Gadsden, P., & Guijarro, M. (2012). The impact of daycare programmes on child health, nutrition and development in developing countries: A systematic review. *Journal of Development Effectiveness, 4,* 472–496.

Lewbel, A., Dong, D., & Yang, T. T. (2012). Comparing features of convenient estimators for binary choice models with endogenous regressors. *Canadian Journal of Economics, 45,* 809–829.

Lokshin, M., Glinkaya, E., & Garcia, M. (2000). *The effect of early childhood development programs on women's labor force participation and older children's schooling in Kenya* (Policy Research Report on Gender and Development, Working Paper Series No. 15). Washington, DC: World Bank.

Lundin, D., Mörk, E., & Öckert, B. (2008). How far can reduced childcare prices push female labour supply? *Labour Economics, 15,* 647–659.

Martinez, S., Naudeau, S., & Pereira, V. (2012). *The promise of preschool in Africa: A randomized impact evaluation of early childhood development in rural Mozambique*. New Delhi, India: International Initiative for Impact Evaluation.

Murphy, A. (2007). Score tests of normality in bivariate probit models. *Economics Letters, 95,* 374–379.

Murungi, C. G. (2013). Reasons for low enrolments in early childhood education in Kenya: The parental perspective. *International Journal of Education and Research, 1*(5), 1–10. Retrieved from https://www.ijern.com/images/May-2013/34.pdf

Quisumbing, A. R., Hallman, K., & Ruel, M. T. (2007). *Maquiladoras* and market mamas: Women's work and childcare in Guatemala City and Accra. *Journal of Development Studies, 43,* 420–455.

Rindfuss, R. R., & Brewster, K. L. (1996). Childbearing and fertility. *Population and Development Review, 22*(Suppl.), 258–289.

Ronsen, M. (2004). Fertility and public policies—Evidence from Norway and Finland. *Demographic Research, 10,* 143–170. https://doi.org/10.4054/DemRes.2004.10.6

Rosero, J., & Oosterbeek, H. (2011). *Trade-offs between different early childhood interventions: Evidence from Ecuador* (Discussion Paper No. 11-102/3). Amsterdam, the Netherlands: Tinbergen Institute.

Samman, E., Presler-Marshall, E., & Jones, N. (2016). *Women's work: Mothers, children and the global childcare crisis*. London, UK: Overseas Development Institute.

Taffa, N., Chepngeno, G., & Amuyunzu-Nyamongo, M. (2005). Child morbidity and healthcare utilization in the slums of Nairobi, Kenya. *Journal of Tropical Pediatrics, 51,* 279–284.

Todd, P. (2013). *How to improve women's employability and quality of work in developing and transition economies* (Working paper). Philadelphia: University of Pennsylvania, Department of Economics.

Tornqvist, A., & Schmitz, C. (2009). *Women's economic empowerment: Scope for Sida's engagement* (Sida Working Paper, December 30). Stockholm: Swedish International Development Cooperation Agency.

UN Habitat. (2014). *State of the world's cities report*. New York, NY: United Nations.

Van den Broeck, G., & Maertens, M. (2015). Female employment reduces fertility in rural Senegal. *PLoS One, 10*(3), e0122086. https://doi.org/10.1371/journal.pone.0122086

Ware, H. (1977). Women's work and fertility in Africa. In S. Kupinsky (Ed.), *The fertility of working women* (pp. 1–34). New York, NY: Praeger.

Wooldridge, J. (2010). *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.

World Bank. (2011). *World Development report 2012: Gender equality and development*. Washington, DC: World Bank.
World Bank. (2017). *World Bank gender data portal*. Washington, DC: World Bank. Retrieved from http://datatopics.worldbank.org/gender/country/kenya