Estimating the Costs for Implementing a Maternity Leave Cash Transfer Program for Women Employed in the Informal Sector in Brazil and Ghana.

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Title Page

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Abstract

Background

Maternity leave policies are designed to protect gender equality and the health of mothers in the workforce and their children. However, maternity leave schemes are often linked to jobs in the formal sector economy. In low- and middle-income countries a large share of women work in the informal sector, and are not eligible to such benefit. This is worrisome from a social justice and a policy perspective.

Methods

We developed and applied a costing methodology to assess the cost of a maternity leave cash transfer to be operated in the informal sector of the economy in Brazil and Ghana, two countries with very different employment structures and socioeconomic contexts.

Results

The relative cost of rolling out a maternity intervention in Brazil is between 2.2 to 3.2 times the cost in Ghana depending on the benchmark used to assess the welfare measure. We applied different scenarios that involve different coverage in weeks to assess the sensibility of the program costs while providing an array of possibilities towards its application.

Conclusions

Findings show how a standard methodology that relies on routinely available information is feasible and could assist policymakers in estimating the costs of supporting a maternity cash

transfer for women employed in the informal sector, such intervention is expected to contribute to social justice, gender equity, and health trajectories.

Keywords: breastfeeding; maternity leave; maternity cash transfer; informal sector; costing; Brazil; Ghana

Background

Maternity leave policies are designed to protect gender equality and the health of mothers in the workforce and their children (1, 2). Globally, paid maternity leave has gradually become a standard social benefit with more than half (53%) of the countries around the world now adopting the International Labor Organization (ILO) standard of at least 14 weeks of leave (3, 4). However, women who work in the informal economy, are commonly not covered by formal arrangements (5). This is worrisome from a social justice and a policy perspective as women make up a disproportionate percentage of employees in the informal sector, especially in low- and middle-income countries. According to data from the United Nations, in Asia over 80% of women in non-agricultural jobs, 74% in sub-Saharan Africa, and 54% in Latin American and the Caribbean are employed in the informal economy (6).

Women working in the informal economy are oftentimes not protected by labor laws and social benefits, such as maternity leave (3). Lack of maternity leave benefits is likely to place households at further income insecurity if pregnant women and mothers working in the informal sector stop working even for a short period of time. Therefore, many pregnant women in the informal economy opt to continue working far into their pregnancy and return to work too soon after childbirth, exposing themselves and possibly their children to health, nutrition, and developmental risks. Indeed, previous studies have found that paid maternity leave is positively associated with improved mental and physical health of mothers and children (2, 7). Hence the difference in the level of maternity protection between women employed in the informal sector versus those employed in the formal sector represents a major inequity and human rights violation with major household and social repercussions.

76 Maternity leave benefits have also been associated with more optimal breastfeeding
77 practices (2, 8, 9), including exclusive breastfeeding (EBF) for the first 6 months and breastfeeding
78 continuation up to 2 years and beyond along with the timely introduction of safe and adequate
79 complementary foods 6 months after birth. Hence, an important negative consequence associated
80 with the lack of maternity leave benefits are the loss of a constellation of health benefits that
81 breastfeeding offers to children, mothers, and society at large (10, 11). Breastfed infants compared
82 to non-breastfed have improved cognitive development, reduced the risk of overweight and obesity
83 and fewer childhood illnesses such as gastrointestinal infections and pneumonia (12, 13).
84 Moreover, breastfeeding reduces the risk of ovarian and breast cancer, type 2 diabetes, and
85 cardiovascular diseases (11, 14). Therefore, the lack of maternity protection among informally
86 employed women represents a major breastfeeding inequity driven by social determinants of health
87 (11, 15).

88 There is strong justification for developing effective maternity benefits for women
89 employed in the informal sector who are commonly ineligible for social security benefits including
90 maternity leave. However, expanding access to benefits such as these remains a complex
91 challenge. Although the ideal solution would be to provide equal labor protections to all women
92 regardless of their source of employment, this would require a structural change that is unlikely to
93 happen in the short-term. Hence, there is an urgent need to propose innovative and pragmatic
94 approaches to provide maternity benefits to informally employed women. A policy instrument
95 proposed by the ILO is a maternal benefit cash transfer (3, 16). Cash transfers have been
96 increasingly adopted as social protection strategies in many low- and middle-income countries
97 (LMICs) (17). A recent systematic literature review and a realist review concluded that cash
98 transfers can provide a wide range of beneficial health, nutrition, economic, and social benefits

99 (e.g., income sources) to women, children, and other individuals living in households in LMICs
100 (18, 19). Interestingly, none of the cash transfers included in these reviews specifically included a
101 maternity cash transfer. However, there is indirect evidence that maternity benefits based on a cash
102 transfer approach are likely to work as, for example, non-contributory pensions or those seeking
103 to reduce child labor report a reduction in labor intensity (i.e., the time spent working) (18).

104 Cash transfer programs can also help foster gender equity as often times the transfers are
105 provided directly to women (18, 19). Empirical evidence from different world regions strongly
106 suggests that a maternity leave cash transfer could help protect households against economic
107 shocks. These shocks could result in a very short or almost complete absence of maternity
108 protection among women employed in the informal sector. This in turn can put the health and
109 wellbeing of women, children, and the household as a whole at high risk. Indeed, there is evidence
110 that when cash is transferred in a predictable manner, it is expected to have positive effects on
111 household expenditure (20). A maternity leave cash transfer could have short-term effects, such as
112 increasing the chances that a working woman could stay home with her baby without facing an
113 economic contraction, ensure a basic level of income for informally employed women and their
114 families, and, in turn, benefit from long-term effects including improved health and nutrition for
115 the infant. As these types of policy instruments are just being considered, there are gaps in
116 understanding how much the maternity cash transfer would cost and how it can be delivered. From
117 a programmatic and policy perspective, this information is crucial for policymakers to understand
118 the feasibility of extending such an intervention as well as to gauge the funds that are necessary to
119 budget towards this end.

120 A macro-costing framework to estimate the annual cost of a maternity leave cash transfer
121 for informally employed women was recently developed (21) and has been successfully applied to

122 Mexico (21), Indonesia (22), and the Philippines (23). We aim to expand this body of literature by
123 estimating the cost of implementation of a maternity leave cash transfer in two LMICs with quite
124 contrasting economic, social, and political contexts, Ghana and Brazil. This work is useful and
125 informative because none of the prior costing studies have compared the maternity cash transfer
126 costs in countries with different employment structures and varying regional contexts using one
127 standard costing methodology. Therefore, in this study, we seek to test the adaptability of the
128 costing approach in countries with different informal sector challenges. Currently, neither Brazil
129 nor Ghana have a program or intervention package in place to offer maternity protection to women
130 employed in the informal sector. These countries are different across several domains: economic
131 development (GDP is almost 3 times higher in Brazil than Ghana), geographic region (sub-Saharan
132 Africa, South America), labor market structure (including women participation rate in the informal
133 sector, which is twice as much in Ghana, 83.2%, than in Brazil, 38.2%), fertility rates (higher in
134 Ghana, 3.9, than in Brazil, 1.7), and breastfeeding indicators (larger in Ghana, 52.1%, than in
135 Brazil, 45%) (Table 1). We expect that this comparative study, for the first time, not only illustrates
136 how a standard methodology that relies on routinely available information can assist policymakers
137 in estimating the costs of supporting maternity benefits of women employed in the informal sector
138 no matter the social, economic, and political context of the country. It will also provide estimates
139 of the magnitudes of the costs for applying such an intervention in two very different informal
140 employment structures.
141

142 **Table 1. Characteristics of the countries: Brazil and Ghana**

Variable	Brazil	Ghana
Total Population, no	211,049,527	30,417,856

GDP per capita, PPP$	14652	5413
Informal employment, % [a]	38.27	83.18
Working-age population, % (15-64 years)	69.74	59.54
Labor force female, %	43.58	46.50
Population of women, no. (%)	107,316,363 (50.85)	15,001,771 (49.32)
Fertility rates, total births per woman	1.73	3.87
Current duration, maternity leave (weeks) for the formal sector[b]	17	12
Exclusive breastfeeding, % of children aged under 6 months[c]	45.0	52.1

Notes: GDP, Gross Domestic Product; PPP$, Purchasing Power Party constant 2017 international dollars.

[a]Informal employment is based on a harmonized measure of the International Labour Organization (ILO), is reported in the World Development indicators 2015 (32).

[b]Data were form ILO 2014 (3).

[c]Data for Ghana was obtained from the World Development Indicators 2014 (32) and for Brazil from the Indicadores de aleitamentomaterno no Brasil, ENANI (33).

Data sources: World Development Indicators 2019 (32) (unless otherwise specified).

Methods

Settings. We estimated the costs for implementing a maternity cash transfer for mothers employed in the informal sector, using nationally representative cross-sectional data, employment, and fertility data, from Brazil and Ghana. The data were comparable across countries thematic wise, but were collected at different times; data were collected in 2015 for Brazil and 2017 for Ghana.

158 *Costing methodology.* To estimate the annual cost of implementing the maternity cash transfer for
159 informally employed women, we used the methodology proposed by Vilar-Compte et al. (21),
160 which was an adaptation from a costing methodology from the World Bank (24, 25), designed to
161 estimate the financial needs for scaling up nutrition interventions to achieve the World Health
162 Assembly global nutrition objectives.

163 The costing approach followed in our study is based on the following equation:

164 $$ML_y = CT * IC_y * (\alpha * Pop_y) + AdmCost_y$$

165 where ML_y is the maternity cash transfer (CT) cost needed for a year of intervention, CT is the CT
166 unit cost, IC_y is the number of weeks the CT would cover a woman in year *y*, and $(\alpha * Pop_y)$ is
167 the population of women of reproductive and legal working ages in a given country in year *y*
168 weighted by α (probability of having given birth according to women's demographic
169 characteristics). $AdmCost_y$ refers to the administrative costs in a given year required to operate
170 the intervention.

171 A key aspect of our costing methodology is that it is based on six clearly defined steps that
172 can be replicated across countries. The methodology requires nationally representative survey data
173 on employment and fertility, as well as demographic data to adequately weight the population size,
174 all of which are commonly available in most countries.

175 *Application of the costing methodology.* The costs of implementing a maternity CT for informally
176 employed women was estimated in Brazil and Ghana using the six-step methodology (Table 2).

177 [Table 2. Insert here]

178 **Step 1** estimated the number of women of reproductive and legal working ages who
179 reported having a child in the last year (Table 2). This information was needed to compute α.
180 Based on these data, women of reproductive age were categorized by demographic subgroups

181 according to their age, marital status, educational attainment, and urban-rural area of residence.
182 Although the objective was to fully harmonize the estimation process for Brazil and Ghana, we
183 also aimed to capture local conditions. Therefore, slight differences in variable categorization
184 occurred between countries due to contextual differences (i.e., the number of categories of
185 educational levels) (Table 2). These differences explain the different number of possible
186 combinations of women's characteristics in each country. For each of these combinations, the
187 proportion of women who reported giving birth in the previous year was estimated. For example,
188 the proportion of women 16 to 24 years old, single and without education, living in an urban area
189 in Brazil and who reported having a baby in the prior year was 10.3%.

190 **Step 2** focused on determining the probability of a woman working in the informal sector
191 having had a baby in the prior year (α). This required defining informal employment, which varied
192 between countries (Table 2). Then using the combinations generated in Step 1, employment
193 information was applied to estimate the probability of having had a child in the prior year among
194 informally employed women. This required linking fertility and employment data for each
195 subgroup combination.

196 **Step 3** centered on identifying the target population Pop_y (women of reproductive and
197 legal working age in each country) through national population estimates using the World Bank
198 population projections for both countries (Table 2). To compute $(\alpha * Pop_y)$, the national
199 population of women of reproductive age was then weighted by each of the $\alpha's$ estimated in Step
200 2.

201 **Step 4** estimated the CT amount that could be provided to informally employed women. It
202 was defined through two common welfare measures: the minimum wage and the income poverty
203 line. The minimum wage referred to a "wage floor" and was intended to be sufficient to cover the

costs associated with minimum family living expenses. There were different mechanisms in how each country sets such wages. For purposes of the current analysis, we retrieved the minimum wages for Brazil and Ghana from the *WageIndicator* (26) and standardized them to weekly values. Poverty lines were equivalent to thresholds estimating the minimum level of income deemed adequate for a given country or region. We used the World Bank poverty lines that are based on the costs of living for basic food, clothing, and shelter. As the poverty line represents a basic threshold, we also estimated the cost of a CT at two times the poverty line.

These weekly estimates represented different proxies of the weekly cash transfer (CT). For the costing estimations, CT were multiplied to the weighted population estimated in prior steps, $CT * (\alpha * Pop_y)$. An important assumption in this step is that the CT would be provided to all women working in the informal sector while having an infant. However, different assumptions can be made about coverage, and incremental expansions (Table 2). This could be especially important for countries like Ghana that have a large share of women employed in the informal sector.

Step 5 centered on assessing different scenarios according to the number of weeks covered, which is the incremental coverage (IC*)*. We assessed four relevant alternatives: (i) 12 weeks, which was the current number of weeks covered in Ghana for formally employed women; (ii) 14 weeks, which was the minimum coverage recommended by the ILO, (iii) 18 weeks which was the length of maternity leave for formally employed workers discussed by key stakeholders in Ghana at the time of the study, and (iv) 26 weeks that would be consistent with the WHO recommendations regarding EBF for the first six months of life. To estimate $IC_y * CT * (\alpha * Pop_y)$, the *IC* was then multiplied by the weighted population and the CT.

Step 6 estimated the administrative costs of setting up and managing the maternity CT. The annual administrative costs were computed using other programs as proxies. For Ghana,

information was retrieved from the World Bank about the administrative costs of different social programs. Those that had relatively simple administrative structures to deploy resources were selected (i.e., National Health Insurance Scheme, NHIS, and the Local Entrepreneur and Skill Development Program, LESDEP) and their administrative costs were averaged (approx. 5.8%). Other more sophisticated programs, such as the poverty alleviation CT program named Livelihood Empowerment Against Poverty (LEAP), were not considered appropriate for our modeling as they provide benefits to low-income families for several years through a large and complex infrastructure. We assumed that this infrastructure would not be needed for the maternity CT that would be provided as one payment per pregnancy-child. For Brazil, we used the percentage of administrative costs computed by Vilar-Compte et al (21) for the Mexican maternity cash transfer costing estimations (approx. 5.6%). This decision was based on the similarities in administrative costs in both countries for conditional CT programs such as Bolsa Familia and PROSPERA. In addition, both Brazil and Mexico are upper-middle income countries, with high levels of social inequality and similar operational challenges.

$CT * IC_y * (\alpha * Pop_y) + AdmCost_y$ was estimated by adding the administrative costs to the estimations performed in steps 1 to 5.

All cost estimations were conducted with Stata, version 15 (STATA Corp, College Station USA) expressed in US$ and PPP$ using 2018 as a reference year.

Results

Table 3 presents the characteristics of informally employed women in both countries and the estimated proportions who gave birth in the previous year. The weekly CT in Brazil ranged between PPP$43.2 and PPP$106.6 per woman, and in Ghana between PPP$18.9 and PPP$37.8

250 per woman. For both countries, the CT estimated through the minimum wage was the higher

251 (Table 4).

252 [Table 3. Insert here]

253 **Table 4.** Different operationalization assumptions for cash transfer maternity benefit in Ghana

254 and Brazil based on welfare measures.

	Welfare Reference Measure	**Operationalization**	**Weekly CT**	
Brazil	Minimum wage	*Full*	US$	*58.3*
			PPP$	*106.6*
	Poverty line	*Full*	US$	*23.6*
			PPP$	*43.2*
	Poverty line	*Two times*	US$	*47.3*
			PPP$	*86.4*
Ghana	Minimum wage	*Full*	US$	*11.7*
			PPP$	*32.6*
	Poverty line	*Full*	US$	*6.8*
			PPP$	*18.9*
	Poverty line	*Two times*	US$	*13.5*
			PPP$	*37.8*

255 CT=cash transfer; PPP=purchasing power parity; US=United States.

256 Notes: The minimum wage corresponds to 2019 in both countries. Poverty line corresponds to World Bank poverty line

257 recommendations for upper-middle-income countries (PPP5.50 per day in Brazil) and lower-middle-income countries (PPP3.20

258 per day in Ghana) (40). Values were reported in 2019 US dollars and 2019 PPPs

259

The estimated number of eligible women to receive the CT benefit was 291,699 in Brazil and 434,410 in Ghana (Table 5). The number of beneficiaries was larger in Ghana because it had a larger proportion of women working in the informal sector than Brazil. We computed the total cost of the maternity cash transfer, $MLy = CT * ICy * (\alpha * Popy) + AdmCosty$ considering IC of 12, 14, 18, and 26 weeks (Table 5). In Brazil, implementing a maternity cash transfer for 12 weeks would cost between PPP$159 million annually using the poverty line and PPP$393 million annually with the minimum wage, corresponding to PPP$547 to PPP$1,350 per woman (Table 5) per year. In Ghana, implementing a maternity cash transfer for 12 weeks would cost between PPP$104 million annually with the poverty line and PPP$179 million annually with the minimum wage, corresponding to PPP$240 to PPP$414 per woman (Table 5) per year. Extending the weekly duration of the maternity cash transfer would logically increase the costs in both countries (Table 5).

Discussion

This study estimated different scenarios for the cost of implementing a maternity cash transfer for women employed in the informal sector in Brazil and Ghana. Despite Brazil having a total greater population size, the estimated number of potential beneficiaries in Ghana was greater due to a much larger proportion of women working in the informal economy than in Brazil. Additionally, the fertility rate was different in both countries, a fact that also contributed to a greater estimated number of potential beneficiaries in Ghana. This highlights the importance of weighting the population by α. Although the estimated number of potential beneficiaries in Ghana was greater, the total cost per mother estimates in Brazil were still higher. This resulted from differences in welfare measures between Ghana, a lower-middle income country, and Brazil, an upper-middle

283 income country. This highlights two aspects: the importance of considering the context of
284 countries, and the adaptability of the methodology, which is sensitive to such variations.

285 Implementing a maternity cash transfer will imply the involvement of different
286 stakeholders, institutions, and contextual factors (27). Cost analyses will help stakeholders
287 understand and advocate for the necessary budgetary resources to implement and sustain such
288 intervention (27, 28). While maternity cash transfers have not been implemented, hence there is
289 no clear evidence of their effect, there are two bodies of literature that help inform why this might
290 be a feasible and important intervention to promote social justice for women and infants. First,
291 prior literature has documented that paid maternity leave schemes have positive impacts on
292 maternal and child social, developmental, and health benefits (29, 30). While this has been
293 documented among women working in the formal sector, it is plausible that a parallel impact could
294 be achieved in women working in the informal economy. This is a hypothesis that will need to be
295 tested, as the living conditions and benefits of formally employed women may warrant syndemic
296 effects not achieved through a sole cash transfer. On the other hand, the literature on cash transfer
297 suggests that many interventions achieve the effects expected from a policy design, although the
298 size might be modest. On aspects of employment, Bastagli et al (18) document that non-
299 contributory pensions to older adults through cash transfer schemes, reduce the labor intensity,
300 which is a desirable effect that could potentially be achieved through a non-contributory maternity
301 leave payment. Measuring the effectiveness of such interventions will be fundamental to address
302 the social return of the investments computed through the costing methodology. This is a key area
303 for future research that should target the benefits on the mothers' health and employment
304 trajectories as well as the health and developmental outcomes of infants. In addition, these
305 interventions should be understood from a social justice and gender equity perspective (31).

306 The current research has some limitations. First, despite our efforts to standardize the
307 costing method, there were variations in the national-level surveys, such as time periods of data
308 collection and structure of surveys. Despite such differences in the data sources in each country,
309 we were able to estimate the relevant parameters. A hindrance linked to the standardization was in
310 terms of differences between countries in the definition of some variables, like education, that led
311 to the different categorization of variables. This does not affect the application of the methodology
312 to estimate parameters that are applicable and valid to each context. Second, the administrative
313 costs were calculated from analogous programs – in Ghana from other subsidies with a potential
314 similar structure, and in Brazil by imputing the percentage of the administrative costs estimated
315 for a similar country (21). This is an area that will require further research if such cash transfers
316 start to get implemented.

317 It is fundamental to acknowledge that while maternity leave protection is a key policy to
318 promote and support working mothers and their babies (i.e., employment trajectories,
319 empowerment, breastfeeding choices, nurturing care), other areas of intervention should also be
320 addressed to ascertain that informally employed women have fairer opportunities such as
321 workplace policies, and childcare amongst others.

322

323 **Conclusions**

324 Findings show how a standard methodology that relies on routinely available information is
325 feasible and could assist policymakers in estimating the costs of supporting a maternity cash
326 transfer for women employed in the informal sector. Supportive labor market interventions are
327 fundamental for informally employed women, especially in LMICs.

328

329

330

331 **List of abbreviations**

332 - Cash Transfer (CT)
333 - Exclusive Breastfeeding (EBF)
334 - Gross Domestic Product (GDP)
335 - Incremental Coverage (IC)
336 - International Labor Organization (ILO)
337 - Livelihood Empowerment Against Poverty (LEAP)
338 - Local Entrepreneur and Skill Development Program (LESDEP)
339 - Low- And Middle-Income Countries (LMICS)
340 - National Health Insurance Scheme (NHIS)
341 - Women of Reproductive Age (WRA)

342

343 **Declarations**

344 **Author's Contributions:**

345 **G. Carroll:** Conceptualization**,** Formal Analysis, Investigation, Data Curation, Writing –
346 Reviews and Editing. **Mireya Vilar-Compte:** Conceptualization, Methodology, Formal
347 Analysis, Writing – Original Draft, Visualization, Supervision. **Graciela Teruel:**
348 Conceptualization, Methodology, Writing – Reviews and Editing. **Meztli Moncada:** Formal
349 Analysis, Investigation, Data Curation, Visualization. **David Aban-Tamayo:** Formal Analysis,
350 Data Curation. **H. Werneck:** Formal Analysis, Investigation, Data Curation, Writing – Reviews
351 and Editing. **R. Montes de Moraes:** Formal Analysis, Investigation, Data Curation, Writing –

Reviews and Editing. **Rafael Pérez-Escamilla:** Conceptualization, Writing – Reviews and Editing, Supervision.

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Competing interests: "The authors declare that they have no competing interests"

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473 **Table 2.** Methodological steps for estimating the annual costs of a maternity cash benefit for informally employed women in Brazil

474 and Ghana

Step	Aim	Data used	Process	Variables input	Notes

1	Compute the probability of a women having a baby in the previous year, given a set of women's characteristics, needed to compute the value of α in Step 2	Fertility data sources:
		• **Brazil**: National Household Sample Survey 2015 (PNAD) (34)
		• **Ghana**: Ghana Living Standard Survey 2017 (GLSS7) (35)
			• Identify women of reproductive age (16-49 years)
			• Among this subset of women, generate combinations based on:
			  ○ Age
			  ○ Marital status
			  ○ Educational level
			  ○ Locality (based on country level definitions)
			• For each of the combinations, calculate the percentage that had a live birth in the prior year (as a proportion of the total number of women of reproductive age)
				Age groups
				• **Brazil& Ghana**: 16-24; 25-29: 30-34; 35-39; 40-49.
				Marital status
				• **Brazil& Ghana**: single; married/living with a man; widow/divorced/separated.
				Educational level
				• **Brazil**: no education; kindergarten or incomplete primary; complete primary or incomplete middle; complete middle or incomplete high school; complete high school; higher or any technical career.
				• **Ghana**: no education; primary or kindergarten; secondary/middle or incomplete high school; complete high school or higher incomplete or
					Number of combinations:
					• **Brazil**: 180
					• **Ghana**: 150

				technical career; higher complete or more. Locality • **Brazil & Ghana**: rural; urban	
2	Estimate the probability of a women working in the informal sector having a baby in the prior year ($\boldsymbol{\alpha}$), given a set of women's characteristics	Fertility and employment data: • **Brazil**: National Household Sample Survey 2015 (PNAD) (34) • **Ghana**: Ghana Living Standard Survey 2017 (GLSS7) (35)	• Define informal employment • Using the demographic groups generated in step 1, add employment information to estimate the probability of having a baby only among informally employed women	Informal employment • **Brazil**: individuals without a formal contract, including domestic workers, employers and self-employed workers who do not contribute to social security, unpaid workers, as well as workers in production for own consumption and construction for own use. Variables to operationalize: occupation and social security contribution (36) • **Ghana**: individuals who don't have at least one social benefit (maternity leave, sick leave or holidays) and were without a written or verbal contract (37). Variables to	Employment in the formal and informal sector can vary by each country, national definitions should be prioritized (38)

				operationalize: holidays, paid leaves and contract	
3	Estimate the population of women of reproductive age weighted by the probability of having a baby in the previous year based on individual characteristics ($\boldsymbol{\alpha * Pop_y}$) This step seeks to generate a more realistic estimate the number of women employed in the informal sector who may claim maternity leave in a given year (i.e., target beneficiaries)	Census data: • **Brazil:** 2010 Census (IBGE 2012) • **Ghana:** 2010 Census (GSS 2010) Population projections: • **Brazil**: World Bank 2015 population projections for age group (39) • **Ghana**: World Bank 2017 population projections for age group (39) Employment Data: • **Brazil**: National Household Sample Survey 2015 (PNAD) (34)	• Identify national estimates of women of reproductive age (16-49 years) currently working in the informal sector for Pop_y • Multiply the population by each of the values of α's generated in step 2	• Number of women 16-49 years currently working in the informal sector	While some surveys used in steps 1 and 2 may have expansion factors (e.g., Brazil), we strongly recommend not using them as they were generated for expanding other population subgroups. This may increase the error of any estimated parameter.

		• **Ghana**: Ghana Living Standard Survey 2017 (GSS 2017) (35)			

4	Estimate the weekly cost ($\boldsymbol{UC_{CT}}$) of the maternity cash transfer (**CT**) using common welfare measures (i.e., minimum wages, poverty lines).	Minimum wage:
		• For both countries were retrieved from the *WageIndicator* (26). This information can be retrieved from national offices as well.
		
		Poverty lines:
		• For both countries were estimated based on the oncome poverty line from the World Bank (40)
			• Determine the weekly maternity cash transfer through minimum wages and poverty lines	Cash transfers:
				• Estimations can be performed through different operationalizations of the minimum wage and the poverty line, which may depend on contextual aspects.
				• For purposes of the current analysis the maternity cash transfer was estimated at:
				  ○ the minimum wage
				  ○ the poverty line
				  ○ twice the poverty line
					The assumption for the two countries was that maternity cash transfer would be provided to all eligible women in one year, but incremental coverage could be modelled.

5	Determine the number of weeks to be covered, or incremental weekly coverage of the maternity cash transfer ($\boldsymbol{IC_y}$)	International and national organization documents establishing length of maternity leave coverage	• Determine the duration of the maternity leave cash transfer program.	For both Brazil and Ghana, the following durations were used for comparing estimates: • **12 weeks:** current duration of maternity leave in the formal sector in Ghana	Could include durations established policies for the formal sector

	according to relevant thresholds			• **14 weeks**: duration recommended by the ILO • **18 weeks**: duration of maternity leave for formal workers currently discussed by key stakeholders in Ghana and approximate current duration of maternity leave in the formal sector in Brazil • **26 weeks:** durations to support EBF	
6	Determine the administrative cost of operating the maternity leave cash transfer program ($\boldsymbol{AdmCost_y}$). Multiply the weekly cost of the maternity CT (UC_{CT}) by incremental coverage ($\boldsymbol{IC_y}$) by the weighted population ($\boldsymbol{\alpha * Pop_y}$) andadd the yearly administrative costs ($\boldsymbol{AdmCost_y}$) to determine the total annual cost of the	Administrative costs of programs similar in structure (i.e. one-time subsidy for a specific purpose) or from the same intervention in similar countries: • **Brazil**: the estimated administrative costs for the Mexican maternity cash transfer (21) • **Ghana**: average of the administrative costs of two	Multiply the number of weeks to be covered ($\boldsymbol{UC_{CT}}$) by $(\boldsymbol{IC_y})$ by ($\boldsymbol{\alpha * Pop_y}$). This will estimate the annual cost of the expansion in the maternity leave coverage. Add the administrative costs to $(\alpha * Pop_y) * CT * IC_y$	Administrative costs: • **Brazil**= 5.6% • **Ghana**=5.8%	This step requires gathering the best locally available data to estimate the administrative costs. Sometimes it can be retrieved from national budgets if they are publicly available (21). If unavailable, regional data may be used (24).

	maternity cash transfer program ($\boldsymbol{MatCT_y}$).	programs (i.e., LESDEP and NHIS) (41)			

475 EBF=exclusive breastfeeding; ILO=International Labour Organization; WRA=women of reproductive age.

476 **Table 3.** Characteristics of women of reproductive age informally employed in Brazil and Ghana

Variable by country	Women informally employed	
	Estimated total % (n)	Estimated % (n) giving birth in previous year
	Brazil	
Age, years		
16 to 24	20.1(3,592)	4.2(151)
25 to 29	14.4(2,562)	4.5(115)
30 to 34	16.9(3,016)	3.8(115)
35 to 39	17.9(3,187)	2.1(67)
40 to 49	30.8(5,493)	0.1(5)
Education level		
No education	4.1(739)	1.6(12)
Kindergarten or incomplete primary	10.1(1,802)	2.3(41)
Complete primary or incomplete middle	13.4(2,390)	2.8(7)
Complete middle or incomplete high school	20.5(3,651)	3.0(110)
Complete high school	35.6(6,363)	2.7(172)
Higher or any technical career	10.1(1,802)	2.6(47)
Marital status		
Single	35.4(6,324)	1.8(114)
Married/living with a man	56.6(10,109)	3.3(334)
Widow/divorced/ separated	7.9(1,417)	1.7(24)
Locality		
Urban	87.6(15,633)	2.6(406)

Rural	12.4(2,217)	2.9(64)
	Ghana	
Age, years		
16 to 24	25.9(2,368)	8.5(201)
25 to 29	15.7(1,431)	16.3(233)
30 to 34	16.4(1,499)	14.1(211)
35 to 39	15.5(1,411)	7.3(103)
40 to 49	26.5(2,418)	2.9(70)
Education level		
No education	32.3(2,945)	10.7(315)
Primary or kindergarten	19.9(1,819)	10.2(186)
Secondary/middle or incomplete high school	37.0(3,377)	7.6(257)
Complete high school or higher education incomplete or technical career	10.6(965)	6.4(62)
Higher complete or more	0.2(21)	4.7(1)
Marital status		
Single	23.6(2,152)	2.8(60)
Married/living with a man	65.6(5,991)	12.2(731)
Widow/divorced/ separated	10.8(984)	2.8(28)
Locality		
Urban	34.7(3,164)	10.6(335)
Rural	65.3(5,963)	5.9(352)

477 *Notes:* Brazilian estimations were based on PNAD (2015) (34). Ghanaian estimations were based on GLSS (2017) (35).

478

479 **Table 5.** Estimated costs of an annual maternity cash transfer for women informally

480 employed in Brazil and Ghana

Variable	Brazil		Ghana	
Population of eligible women	291,699		434,410	
Annual cost per 12 weeks of MCT	**Total Cost**	**Cost per women**	**Total Cost**	**Cost per women**
Minimum wage US$	215,430,093	739	64,374,448	148
Minimum wage PPP$	393,709,016	1,350	179,716,519	414
Poverty line US$	87,357,703	299	37,326,468	86
Poverty line PPP$	159,650,467	547	104,205,673	240
Twice the poverty line US$	174,715,407	599	74,652,936	172
Twice the poverty line PPP$	319,300,935	1,095	208,411,347	480
Annual cost per 14 weeks of MCT				
Minimum wage US$	251,335,094	862	75,103,525	173
Minimum wage PPP$	459,327,163	1,575	209,669,277	483
Poverty line US$	101,917,323	349	43,547,547	100
Poverty line PPP$	186,258,883	639	121,573,291	280
Twice the poverty line US$	203,834,646	699	87,095,094	200
Twice the poverty line PPP$	372,517,766	1,277	243,146,581	560
Annual cost per 18 weeks of MCT				
Minimum wage US$	323,145,120	1,108	96,561,673	222
Minimum wage PPP$	590,563,489	2,025	269,574,779	621
Poverty line US$	131,036,559	449	55,989,704	129

Poverty line PPP$	239,475,716	821	156,308,517	360
Twice the poverty line US$	262,073,119	898	111,979,409	258
Twice the poverty line PPP$	478,951,432	1,642	312,617,034	720
Annual cost per 26 weeks of MCT				
Minimum wage US$	466,765,205	1,600	139,477,979	321
Minimum wage PPP$	853,036,213	2,924	389,385,808	896
Poverty line US$	189,275,038	649	80,874,015	186
Poverty line PPP$	345,909,370	1,186	225,778,962	520
Twice the poverty line US$	378,550,076	1,298	161,748,030	372
Twice the poverty line PPP$	691,818,740	2,372	451,557,923	1039

CT=cash transfer; PPP=purchasing power parity; US=United States. *Notes:* Brazilian estimations were based on PNAD (2015) (34), World Bank population projections for women 16-49 years in Brazil from 2010-2015 (39). Ghanaian estimations were based on GLSS (2017) (35) and World Bank population projections for women between 16-49 years from 2010-2017 (39).