The Price of Labor: Evaluating the Impact of Eliminating User Fees on Maternal and Infant Health Outcomes

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The pricing of healthcare products and services, particularly for the poor, has generated substantial debate in the economics and public health literature. Advocates argue that fees improve financial sustainability by increasing revenues and prevent needless utilization. On the other hand, opponents observe that fees are typically too small to ensure sustainability, and instead act as a barrier to healthcare access for the poor (Kremer and Holla, 2008).

The introduction and subsequent elimination of user fees for cesarean sections and deliveries serves as an example of this debate. In the 1980s and 1990s, the World Bank advocated introducing user fees to meet shortcomings in government health budgets; governments worldwide then began implementing fees (Akin, Birdsall and De Ferranti, 1987). Subsequent research suggested that fees generated revenues covering only 6-9 percent of health budgets, with potentially deleterious effects on health for vulnerable groups (Pearson, 2004; Yates, 2009). Since 2001, several countries throughout sub-Saharan Africa have eliminated user fees for childbirth at public facilities to make healthcare more accessible to the poor, and potentially improve health outcomes.

In this paper, I test whether abolishing user fees for cesarean sections and deliveries affected maternal healthcare utilization and ultimately decreased child or maternal mortality. Despite the importance of this topic, the evidence on the effects of user fee removal is scant. Meta-analyses by Lagarde and Palmer (2008) and (Hatt et al., 2013) caution that existing studies analyzing maternal user fee elimination are generally of low quality. However, both conclude that the weak evidence suggests that user fee elimination increases health facility utilization with potentially negative impacts on quality, ranging from understaffed facilities to long lines to absences of medical supplies. As a result of these limitations, it is unclear whether user fee abolition improves health outcomes. Studies with plausible identification include work by McKinnon et al. (2015) and McKinnon, Harper and Kaufman (2015), who use a difference-in-difference framework to estimate the effect of eliminating user fees for three countries using seven countries which kept fees in place as a comparison

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group. These authors find an increase in facility-based deliveries and a decline in neonatal mortality. While options for identification strategies may be limited, whether time trends of other countries appropriately mimic the counterfactual is debatable. In this paper, I contribute new evidence of effect of maternal user fee abolition using two complementary identification strategies: a maternal fixed effect and an event-study framework.

I. Data and Methodology

In this paper, I combine 24 DHS datasets from 10 countries that have all eliminated user fees in at least some part of the country (ICF International, n.d.).[1] The DHS surveys are nationally representative, and contain extensive information on births within the last five years, including where the birth took place and whether the child lived or died.

To identify the impact of user fees, I compare outcomes before and after the policy for the same mother. This specification controls for all time-invariant factors that do not vary by mother, such as rural status or maternal education. I estimate:

$$Y_{im} = \beta_0 + \alpha_1 \mathit{Born\ After\ Policy}_{im} + \alpha_2 \mathit{BirthOrder}_{im} + \gamma_m + \epsilon_{im} \tag{1}$$

where Y are outcomes associated with delivery location, the qualifications of the delivery attendant, and child health for birth i from mother m; γ is a mother fixed effect. I also include *BirthOrder* to account for the fact that child outcomes are associated with birth order (Rutstein, 2000). I cluster standard errors at the mother level.

One limitation of this approach is that the effect on these outcomes are only measured on women who report giving birth both before and after the user fee removal. Therefore, I also employ an event-study framework and compare births occuring immediately before and after the policy within a small geographic area. I estimate the following specification:

$$Y_i = \beta_0 + \beta_1 \mathit{Born\ After\ Policy}_{ic} + \zeta_c + \epsilon_{ic} \tag{2}$$

where Y are the same as above. I include ζ, a household cluster fixed effect, the lowest geographic area identified in the DHS. This specification controls for all factors that do not vary by cluster, such as access to health facilities.To limit the influence of confounding factors I limit the sample to first-births within 12 months of the user fee elimination.[2]

[1]See Appendix Table A for a complete list of countries and policy dates.

[2]This specification unfortunately lacks a plausible comparison group. Appendix Table B tests whether characteristics are associated with birth timing; only marital status is significant. Results are robust to the inclusion of these controls (not shown).

However, delivery choices are only observed among women who are alive, potentially biasing results. I compile all available DHS datasets with a maternal mortality module from these countries. I then analyze whether the rate of pregnancy-related deaths changes among all deaths for women age 16-45 at the time of their death after user fee elimination.

II. Results

Table 1 presents results from Equation (1); additional results are in Appendix Table C. User fee elimination increases the public health facility deliveries by 2 percentage points (5 percent) with a 1.5 percentage point increase in deliveries by a skilled attendant, a cost-effective proposal to improve maternal and neonatal outcomes (Adam et al., 2005). I find no effect on cesarean sections. I find that neonatal mortality increases; babies born after the policy took effect are 1.3 percentage points less likely to live through the first month.

Table 2 presents results from Equation (2); additional results are in Appendix Table D. First births occurring after eliminating user fees are 7.4 percentage points (14 percent) more likely to occur in public health facility deliveries, driven by a 5 percentage point decrease in home deliveries. There is a 7 percentage point increase in deliveries by skilled attendants and a 2 percentage point increase in cesarean sections. I find no effect on neonatal mortality, a result robust to using a hazard model specification (not shown).

The increased or stagnant neonatal mortality may reflect that user fees change the composition of mothers giving birth, or may alternatively indicate that pervasive low-quality limits the effectiveness of public health facilities at improving infant survival. Appendix Table E presents suggestive evidence of the former. I find there is a 1 percentage point decrease in the likelihood of a maternity-related death, a 10 percent reduction. The increased likelihood of skilled delivery attendants may assist in helping marginal mothers survive, but the widespread lack of facility amenities may hamper neonatal survival. However, I caution that point estimates are smaller and statistically insignificant from zero in some specifications. These robustness checks suggest there may be important omitted variables or time trends that I cannot account for in this analysis.

III. Discussion and Conclusion

This project contributes to the vast public health literature on whether user fees should be used in resource-poor environments. By amassing results from 10 countries, this paper estimates the average effect of user fee implementation that may help policymakers evaluate cost-effectiveness. Second, this project answers a general question: should healthcare provided for free or instead be rationed through fees? Results suggest that the marginal birth occurring as a result of user fee elimination is more likely to occur in a public health facility, by a skilled attendant. User fee reductions specifically reduce deliveries by traditional birth attendants and friends, attendants that would be unable to adequately handle a labor emergency; c-sections also increase in some specifications. I find suggestive evidence that maternal mortality improves. However, I also find that neonatal mortality does not improve and may actually decline, suggesting other interventions should be pursued to improve infant outcomes. One limitation of this analysis is that I am unable to account for whether the user fee elimination policy actually decreased prices charged to birthing women. To the extent that some women were still charged for their deliveries, then results are best be interpreted as a lower bound on the health impacts of user fees. Overall, I conclude that abolishing user fees is effective at reducing the riskiness of births and may improve maternal healthcare outcomes.

Table 1—Results from Maternal Fixed Effect Specification

Variables	Public Facility (1)	Skilled Attendant (2)	C-Section (3)	Lived First Month (4)
Born After Policy	0.020**	0.015*	0.000	-0.008*
	(0.010)	(0.009)	(0.003)	(0.005)
Birth Order	0.009***	0.009***	0.002**	0.015***
	(0.003)	(0.003)	(0.001)	(0.002)
Observations	167,545	167,345	159,649	167,530
R-squared	0.883	0.897	0.901	0.634
Mean of Dep Variable, Pre-Period	0.403	0.476	0.034	0.972

Note: Notes: Sample is all births and excludes observations with missing data. All specifications are linear probability models and include a maternal fixed effect. Public faciity includes all non-private, non-home providers, including hospitals, community health centers, and public clinics. Whether the delivery was via cesarean-section was not asked in all surveys. Skilled attendant includes doctors, nurses, and trained aides. Robust standard errors in parentheses, clustered at the respondent level. $***p < 0.01, **p < 0.05, *p < 0.1$

Table 2—Results from Event Study Specification

Variables	Public Facility (1)	Skilled Attendant (2)	C-Section (3)	Lived First Month (4)
Born After Policy	0.074***	0.070***	0.020*	-0.002
	(0.020)	(0.019)	(0.012)	(0.011)
Observations	5,267	5,266	5,260	5,267
R-squared	0.663	0.705	0.586	0.527
Mean of Dep Variable, Pre-Period	0.529	0.612	0.069	0.96

Note: Sample is all first births that occurred within 12 months of the policy and excludes observations with missing values. All regressions are linear probability models and include a control for the household cluster within each survey. Public facility includes all non-private, non-home providers, including hospitals, community health centers, and public clinics. Whether the delivery was via cesarean-section was not asked in all surveys. Skilled Attendant includes doctors, nurses, and trained aides. Robust standard errors in parentheses.$***p < 0.01, **p < 0.05, *p < 0.1$

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