The Effects of Drought on the Marriage Market: Forces of Delay and Forces of Acceleration

#Drought, #Marriage market, #Bride price, #Climate shock, #Gender

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1. Introduction and Objectives

The United Nations now describes the present as an "era of global boiling" rather than global warming (United Nations, 2023), signalling that climate change has become a direct threat to livelihoods. In the rain-fed agricultural economies of sub-Saharan Africa, droughts and floods destroy arable land and crops and lower household living standards (Amare et al., 2018). Households respond not only through conventional adaptation but also through social institutions, and marriage has been identified as one such coping mechanism—especially where it involves a payment such as bride price or dowry (Corno, Hildebrandt & Voena, 2020).

The marriage-market response to an income shock depends on the direction of marriage payments. Under dowry, paid from the bride's family to the groom's (common in South Asia), an income shock tends to delay marriage. Under bride price, paid from the groom's family to the bride's (common in sub-Saharan Africa), a drought-induced fall in income can instead bring daughters' marriages forward, because marrying a daughter draws in cash, livestock and goods that smooth consumption (Corno et al., 2020; Hoogeveen et al., 2011). Yet hastened marriage is costly: women who marry under environmental stress are matched to poorer, less-educated husbands more accepting of intimate-partner violence (Carrico et al., 2020). A delay might therefore appear benign—but a delay driven by a negative income shock is not the same as a delay driven by widening opportunity; it signals economic distress and a disrupted marriage market rather than empowerment.

Three gaps motivate this study. First, the literature focuses almost entirely on child marriage, leaving the marriage of adult women—where the dynamics of choice differ—largely unexamined. Second, the mechanism is rarely separated: the net direction of the effect is documented, but the competing forces of acceleration and delay are seldom distinguished. Third, heterogeneity has been studied almost only on the bride's side, even though a drought is a covariate shock that also reaches the groom's family and can lower marriage demand.

This study therefore investigates how growing-season drought affects the timing of women's first marriage in Nigeria, considering both delaying and accelerating forces and both sides of the market. It addresses three guiding research questions:

1. How does growing-season drought affect the timing of women's first marriage?
2. Does the adjustment operate on the bride's (supply) side or the groom's (demand) side of the market?
3. Which competing forces of acceleration and delay drive the net effect, and for whom?

2. Methods and Data

Data Source

We combine four waves of the World Bank's LSMS-ISA Nigeria General Household Survey (GHS) Panel (2010/11–2018/19) with high-resolution CHIRPS precipitation data (Climate Hazards Group InfraRed Precipitation with Station data; 0.05° resolution). Using Google Earth Engine, each household's GPS location is matched to the CHIRPS grid, and a 30-year baseline (1991–2020) is used to compute a standardized precipitation anomaly (Z-score) for each location and month. A drought month is a growing-season month (May–October) in which rainfall falls more than a given threshold below its long-run mean; the drought variable is the count of such months in the year (0–6), at thresholds of 1.0, 1.5 and 2.0 standard deviations ("mild", "moderate", "extreme"), with ±1.5 SD as the primary specification. After cleaning for GPS precision and age-reporting consistency, the sample comprises 26,186 person-years from 6,259 women aged 11–35, with 1,619 first-marriage events over the 2011–2018 window.

Empirical Strategy

We estimate a discrete-time hazard model with two-way (individual × year) fixed effects. The dependent variable equals 1 in the year a woman first leaves her natal household to marry and 0 in each earlier at-risk year:

$$Y_{i,t} = \alpha + \beta \cdot Drought\_\{g(i),t-1\} + \Sigma_k \, \delta_k \cdot AgeDummy\_\{k,i,t\} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

where Drought_{g(i),t−1} is the one-year-lagged growing-season drought-month count in household i's grid cell, AgeDummy controls for life-cycle effects (five-year cohorts, 11–15 as reference), μ_i and λ_t are individual and year fixed effects, and the t+1 lead serves as a placebo against anticipation and reverse causality. To locate the adjustment, the model is estimated both for the "leave" hazard (a daughter departs to marry; supply side) and for a parallel "join" hazard (a bride enters a household; demand side). To separate competing forces, we (a) decompose each marriage into same-state vs migratory (cross-state) competing risks, and (b) interact drought with baseline moderators—tribe×religion (a proxy for local bride-price norms), the woman's own labour, household size and headship, education, rural residence, and a ceremony-burden measure (state-median wedding cost relative to household consumption)—adding group-specific year effects ($\lambda_t \times M_i$). Heterogeneity results are treated as exploratory.

3. Results

Our empirical analysis yields three major findings:

- **Drought delays marriage on net.** An additional growing-season drought month in the previous year lowers the annual marriage hazard by about 8–9%, a result robust to placebo tests and to the choice between fixed- and random-effects specifications. The effect is statistically significant at the mild (±1.0 SD) and moderate (±1.5 SD) thresholds and points the same way—though imprecisely—at the extreme threshold, where severe droughts are

rare. The near-zero t+1 placebo lead rules out anticipation and reverse causality. Although the coefficients are small in absolute terms, marriage is a rare, near-once event for most Nigerian women, so an 8–9% change is economically meaningful. This contrasts with the canonical sub-Saharan finding that, under bride price, drought accelerates child marriage (Corno et al., 2020): for adult women in Nigeria, the delaying forces dominate on net.

Drought intensity	(causal) t−1	(placebo) t+1	Implied % Δ hazard
±1.0 SD	−0.0050* (0.0027)	+0.0023 (0.0021)	−8.4%
±1.5 SD	−0.0051* (0.0031)	+0.0020 (0.0024)	−8.5%
±2.0 SD	−0.0060 (0.0048)	+0.0050 (0.0041)	−10.1%

*Note: Effect of drought on the hazard of first marriage. Discrete-time hazard, two-way (individual × year) fixed effects; each cell is a separate regression on the drought month-count at the indicated threshold. Mean of the dependent variable = 0.0596; N = 25,841 person-years (6,259 women). A near-zero t+1 placebo lead supports a causal reading. *** p<0.01, ** p<0.05, * p<0.1; SE in parentheses.*

- **The adjustment runs through the bride's side.** Drought lowers the "leave" hazard (fewer daughters depart to marry) but leaves the "join" hazard (the rate at which households take in brides) essentially unchanged and insignificant. The response therefore lies in the decisions of the woman's family rather than in groom demand, weighing against a groom-affordability story.
- **The net delay masks opposing forces.** Two forces hold marriage back. (i) A fall in the local bride price: the delay is concentrated entirely among same-state marriages (−0.0052* at ±1.5 SD), while cross-state migratory marriages—exposed to a different and often unaffected local market—are unchanged. (ii) The unaffordability of the wedding: households facing a heavier ceremony burden (wedding cost relative to consumption) postpone by more (β_2 = −0.0090 to −0.0202), whereas wealth alone does not moderate the effect. Three forces pull the other way in particular subgroups: bride price as a coping asset where it is high (Yoruba Muslims accelerate, +0.0181** at ±1.5 SD; low-bride-price Hausa Muslims delay, −0.0101**), the collapse of a daughter's own farm income (+0.0129** under mild drought), and acute household vulnerability (female-headed households, +0.0098* to +0.0176*). On balance the delaying forces win, and they concentrate in the poor, agricultural, low-bride-price North.

4. Significance and Implications

Academic Contribution

By treating marriage as a two-sided market in which forces of delay and acceleration coexist, this study moves beyond the literature's focus on child marriage and on the bride's side alone. It shows that, for adult women in a bride-price society, growing-season drought delays rather than accelerates marriage on net; that the adjustment is located on the bride's side of the market; and that a single "bride price accelerates marriage" summary is too simple for a country as internally varied as Nigeria. Using a covariate-shock logic and a same-state vs migratory

decomposition to glimpse the groom's side, it also contributes to the under-studied economics of bride price relative to the better-documented dowry setting.

Policy Implications

- **Read delay as distress, not progress:** because the delay is driven by economic hardship rather than widening opportunity, later marriage under drought should be read as a marker of household vulnerability and marriage-market disruption—not as an improvement in women's conditions—and should trigger, not relax, social protection.
- **Target the most vulnerable:** acceleration concentrates among female-headed and farm-dependent households, so disaster-relief and income-support measures during droughts should prioritize these groups to prevent distress-driven marriages of daughters.
- **Localize the response:** because the bride-price institution—and therefore the marriage-market response—varies sharply across ethnic and religious groups, uniform national policy is likely to fail; climate-adaptation and child-protection strategies should be integrated with local marriage customs and the agricultural, high-ceremony-burden conditions of the North.

5. References

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