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The Risk of Polygamy and Wives' Saving Behavior*

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Abstract

In a polygamous society, all monogamous women are potentially at risk of polygamy. However, both the anthropological and economic literatures are silent on the potential impact of the risk of polygamy on economic decisions of monogamous wives. We explore this issue for Senegal using individual panel data. We first estimate a Cox model for the probability of transition to polygamy. Second, we estimate the impact of the predicted risk of polygamy on monogamous wives' savings. We find a positive impact of the risk of polygamy on female savings entrusted to formal or informal institutions, suggestive of self-protective strategies. This increase in savings comes at the cost of reduced consumption, both in terms of household food expenditures and wives' private non-food expenses.

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1 Introduction

Polygamy[1] is widespread in many developing countries, and although it has been declining since the 1970s, it remains persistent especially in Sub-Saharan Africa, as documented by Fenske (2015, 2013). In 2000, the overall prevalence of polygamy is 28% in the 34 countries studied by Fenske (2015), based on data from the Demographic and Health Surveys on ever-married women of childbearing age. Although in a polygamous society only a certain proportion of unions actually become polygamous, almost all monogamous women are faced with the risk of polygamy. As noted by Antoine (2002), in Senegal, a majority of women will be in a polygamous union at some point in their life.

Socio-anthropological research suggests that the arrival of a second wife is mostly viewed by women in a monogamous union as a threat (Madhavan, 2002; Antoine, 2002). This threat may be exploited by the husband to monitor his wife, who has in general no say in this decision (Madhavan and Bledsoe, 2001). The extensive literature review provided by Bove and Valeggia (2009) substantiates this fear since it shows a negative correlation between polygamy and women's health. However, the economic literature is silent on the potential impact of the anticipation of polygamy on the allocation of resources within households. In particular, no paper, to our knowledge, has investigated the strategies that women in monogamous unions may implement in order to avoid the arrival of a co-wife or to protect themselves against such an event. Only rare qualitative evidence of such strategic behaviours is provided by demographers: Antoine (2002) mentions one of these strategies of monogamous wives consisting in not sharing their income with their husband and driving him to spend more in order to decrease his saving capacity and impede the arrival of a co-wife. Marrying a second wife is indeed costly to the husband: savings are needed to pay for both the wedding and the bride price which has remained high and remarkably stable over time in Senegal, according to our survey data. As for women, they may have incentives to increase their own savings, so as to protect themselves against the arrival of a co-wife which may be viewed as a negative income shock. Depending on their capacity to protect their savings from their husband, we expect different strategies of monogamous wives in response to an increased risk of polygamy. This article thus intends to fill a gap in the literature on polygamy by exploring the impact of the threat of polygamy on

[1] In this article, we use the generic term polygamy for polygyny: polyandry does not exist in Senegal.

monogamous spouses' saving behavior, but also on labor market participation, and resource allocation decisions, in the case of Senegal.

The case of Senegal is particularly interesting since previous studies have shown that the prevalence of polygamy is still high and declines at a slower pace than most other sub-Saharan countries. The share of young women (aged 20 to 24) in a polygamous union has even increased in rural areas from 1986 to 1997 (Antoine, 2002, based on the *Enquêtes démographiques et de santé*, EDS). We use original individual panel data from the two waves of a nationally representative survey (*Enquête Pauvreté et Structure Familiale* (EPSF)) conducted in 2006-2007 and 2010-2012. In our data, in the first wave, 22% of women aged 15 to 60 are in a polygamous union, while this is the case of 38% of married women in the same age category. Our data are unique, and particularly suitable for this analysis since they provide us with detailed information on consumption choices and savings at the individual level. Indeed, the vast majority of survey data in the developing world collect information on savings at the household level and cannot be used to investigate individual saving and consumption strategies. By contrast, we have information at each survey date on the stock of savings of each household member, which allows us to focus on wives' saving and resource allocation decisions.

In the first step of our empirical analysis, we investigate the determinants of polygamy at the union level and estimate the probability of transition from a monogamous to a polygamous union using a survival analysis approach, with a semi-parametric Cox model stratified by the polygamy status of the husband's father. We then predict for each monogamous union, the risk of becoming polygamous at each survey date. In a second step, we exploit the panel structure of our data to identify the impact of the risk of polygamy on saving decisions of monogamous husbands and wives, controlling for union fixed-effects. The identification of the effect of the predicted risk relies on the exclusion from our second-step equation of the interaction between the polygamy status of the husband's father and time, controlling for time-invariant unobserved individual and union characteristics and a wide range of time-varying controls that are likely to correlate with both the probability of polygamy and individual economic decisions.

We find that the risk of polygamy has a positive impact on wife savings but only on savings entrusted to formal or informal institutions, as opposed to savings kept at home, especially for women living in the poorest households. Household food expenditures are found to decrease

with the risk of polygamy, suggesting a possible reallocation of women's resources from food consumption to savings. In addition, women facing a larger increase in their risk of polygamy spend more on the education of their children, but this increase in education expenditures is exclusively funded by a higher contribution of their husband, while their own contribution decreases. They are also found to transfer more to their social networks. These results suggest that the risk of polygamy leads monogamous wives to engage in self-protective strategies, by investing in assets that are out of the reach of their husband and in their social networks. On the other hand, the risk of polygamy is not found to affect women's labor market participation. By contrast, the risk of polygamy is positively correlated with monogamous husbands' labor market participation and income, consistent with an accumulation strategy to afford a second wife.

This paper first contributes to the empirical literature on polygamy initiated by Grossbard (1976). While the theoretical framework provided by Grossbard (1980), based on the theory of marriage developed by Becker (1974), accounts for the emergence and persistence of polygamy at the society level, little is known yet on the micro-determinants of polygamy. Indeed, most research in this area, following Grossbard (1976), is based on the comparison of two groups of individuals according to the type of their union and does not account for self-selection effects. Jacoby (1995) goes further by identifying the causal relationship between female agricultural productivity and polygamy. However, these findings cannot account for the persistence of polygamy in urban areas, as observed in Senegal (Antoine, 2002). Controlling for socio-economic characteristics of both spouses, we find evidence of the transmission of norms regarding polygamy from fathers to sons. In this strand of literature exploring the micro-determinants of polygamy, the approach of this paper is original since we focus on unions and explore the determinants of the transition from monogamy to polygamy based on a survival analysis. Indeed, even in countries where polygamy is the norm, a non negligible proportion of unions will remain monogamous. Note that since we choose to document the determinants of the transition of unions from monogamous to polygamous, single individuals and women marrying as second or higher rank wives are out of the scope of our study.

Second, to the best of our knowledge, this paper is the first to investigate the impact of the anticipation or threat of polygamy on economic decisions of monogamous spouses. The only

studies on the effects of polygamy on household economic behavior focus on polygamous households and do not study the impact of the risk of polygamy on non-polygamous households. Yet, papers analysing the economic impact polygamy are scarce, with the exception of the studies by Dauphin (2013) and Dauphin and Fortin (2001) which focus on the effect of polygamy on the efficiency of agricultural households. At the macroeconomic level, the relationship between polygamy and savings has been explored in a theoretical model by Tertilt (2005). In the author's model, polygamy leads in particular to high bride prices and high fertility, which crowd out other investments. Descriptive evidence of the relationship between polygamy and savings at the micro level is provided by Laiglesia and Morrison (2008). Using household survey data from Ghana, Indonesia and Côte d'Ivoire, the authors find that polygamous households have lower assets per capita than monogamous ones, but they do not account for self-selection into polygamy. Our paper tests another channel for the impact of polygamy on saving decisions based on the strategic behaviors of monogamous wives "at risk" of polygamy.

We focus in this paper on the strategic response of married women at risk of polygamy, who represent a large share of the population in countries where polygamy is legal, to an informal institution, to what seems to be perceived as a negative shock. Indeed, we show that women react to an increase in the risk of polygamy by increasing their precautionary savings, in both formal and informal institutions but out of the reach of their husband, and investing in what could be interpreted as informal insurance devices, through redistribution in their social networks. These self-protective strategies are found to be implemented especially by women in the poorest households, who are less likely to have access to formal insurance schemes and are more economically vulnerable. As shown in the paper, these self-protective strategies come at the cost of lower consumption levels both in terms of household per capita food expenditures and wives' non-food private expenditures. Hence, a better understanding of how polygamy, and even more, the potential risk of polygamy, shape women's saving and resource allocation decisions is crucial to be able to design adequate and well-targeted policies aimed at developing social protection of vulnerable socioeconomic-groups, and in particular women.

The article is structured as follows. Section 2 discusses evidence of non-cooperative behaviors between spouses. In Section 3, we present our empirical model and identification strategy. The data are described in Section 4. Results on the determinants of polygamy, and on the impact

of the risk on polygamy on savings, are presented and discussed in section 5. Finally, Section 6 concludes.

2 The risk of polygamy and savings: discussion of potential channels

Several works have shown that spouses in developing countries do not behave cooperatively, especially in the presence of asymmetries of information (Udry (1996), Ashraf (2009), Castilla and Walker (2013), among others), and that spouses may have conflicting views on the use of household income. For example, different preferences for consumption may lead to different preferences for savings, as modeled by Anderson and Baland (2002) who explain the higher participation of married women from a Kenyan slum to Rotative Savings and Credit Associations (ROSCAs) by a strategy aimed at preserving their savings from their husband.

Polygamy is of particular interest, since it is expected to exacerbate both issues: first, polygamy is a source of asymmetries of information between spouses. Second, it may give rise to opposite incentives to save for husbands and wives.

As regards asymmetries of information first, there seems to be a consensus about the fact that men have the final say on whether to take a second wife (Madhavan and Bledsoe, 2001). Anecdotal evidence even suggest that, in some instances, the first wife is told about the second marriage of her husband only after the ceremony. Husbands thus have private information on the probability and date of arrival of a co-wife in the household.

Second, in a polygamous context, still monogamous husbands and wives may have opposite incentives to save. Note, first, that qualitative evidence in the case of Senegal suggests that husbands and wives do not pool neither their income, nor their savings (Boltz-Laemmel and Villar, 2013). No theoretical work has yet investigated the impact of the risk of polygamy on spouses' saving behavior. However, analogies exist with discussions about the risk of marital dissolution in the context of developed countries (González and Özcan, 2013)[2].

The potential arrival of a second wife represents a potential negative income shock for

[2]Note that other channels may create different incentives to save for married men and women. One in particular is explored by Browning (2000) : based on a two-person household model, best suited to the context of developed countries, he shows that the age difference between spouses and the higher longevity of women generates different incentives to save for men and women.

monogamous wives, who may then have an incentive to increase their precautionary savings. Indeed, in Senegal, the expected contributions of husband and wife to the household budget are not symmetrical: men are expected to provide for their household while women are not (Boltz-Laemmel and Villar, 2013). The arrival of a co-wife thus implies a decrease in the household per capita income and consumption level. Moreover, anecdotal evidence suggests that the cohabitation of co-wives may be a source of conflict. Monogamously married women may thus have an incentive to save more if the perceived risk of polygamy increases, in order to protect themselves against a negative income shock.

A second channel may lead women at risk of polygamy to have higher precautionary savings. When faced with the arrival of a co-wife women have an outside option which is divorce (Antoine, 2002; Locoh and Thiriat, 1995). Divorce is indeed relatively frequent in Senegal. However this option is costly, since divorced women have to leave their former husband's household and either be taken in by a related household or earn their own living, creating additional incentives for wives to increase their precautionary savings[3]. Two recent papers, in the very different contexts of Ireland and the US, indeed suggest that women who are faced with a higher risk of divorce both save (González and Özcan, 2013) and work more (Papps, 2006).

However, the expected impact of an increase in the risk of polygamy on monogamous wives' saving behavior is theoretically ambiguous, since it depends on the possibility for women to protect their own savings from being seized by their husband. Indeed, if the wife's savings can be used by the husband to finance the cost of a second wife, men are expected to have a higher preference for savings than women, as suggested by Antoine (2002). The risk of polygamy may even have a negative impact on wives' savings if women anticipate that their savings will be seized by their husband: indeed, they have no incentive in saving in that case since their savings will facilitate their husband's second marriage. In Senegal, data from the PSF survey suggest that the cost of marrying a second wife is high: in addition to the wedding ceremony and the work to set up a room for the new co-wife, the husband has to pay a high bride price : from 2001 to 2006 the average bride price for the first wife was about 13.2% of the average yearly income of married men and 10.7% for the second wife.

Depending on the possibility for husbands to seize the private savings of their wife, we may

[3]Note, however that in the Senegalese context, divorcing is all the more costly as divorced women are pressed to remarry, and are most often constrained to marry as a second or higher rank wife (Lambert, Villar, and de Walle, 2015).

thus expect different strategic behavior of monogamous wives "at risk" of polygamy. To go further, we need to distinguish different types of savings, depending on their security. While savings held at home may hardly be considered secure, as regards their potential seizure by the other spouse, women have access to other forms of savings and investment. Both qualitative and quantitative data suggest that the largest share of Senegalese spouses' savings are kept out of home and entrusted to formal of informal institutions institutions, suggesting that individuals prefer to rely on costly strategies to keep their own resources out of the reach of potential claimants (Boltz-Laemmel and Villar, 2013; Boltz, Marazyan, and Villar, 2015).

We thus expect women faced with a higher risk of polygamy to increase their secure savings only, led by a precautionary motive. In response to the risk of what is likely to be perceived as a negative shock, women may also have higher incentives to invest in other non-seizable assets, such as their social network, which may prove particularly useful in case of her choosing to divorce, or, in a long term strategy, in the education of their children[4].

Additional channels may explain the impact of the risk of polygamy on wives' economic decisions. As noted by Antoine (2002), monogamous wives may adopt offensive strategies to try to avoid the arrival of a co-wife, especially by driving their husband to spend more in order to decrease his saving capacity. Such a strategy would lead to an increased contribution of the husband to the household and his wife's private expenditures. Anecdotal evidence further suggests that under the threat of polygamy, women may want to increase their attractiveness to their husband, which could lead them to spend more on clothes, at the expenses of other items of expenditures.

3 Empirical approach and identification strategy

Our empirical analysis first aims at documenting the individual and union determinants of the transition of unions from monogamy to polygamy, and second, at investigating the impact of the risk for monogamous wives to become polygamous on their strategic saving decisions.

Our identification strategy, in the second and main part of our empirical analysis, exploits the panel structure of our data and relies on the within-union variation in the risk of polygamy

[4]Another long-term investment strategy could lead women at risk of polygamy to increase their fertility. However the polygamy-fertility nexus is complex, since fertility is expected to affect the risk of polygamy. This issue will be explored in a future work.

between the two survey waves, for initially monogamous unions that have remained monogamous at wave two. More precisely, we identify the impact of the risk of polygamy on monogamous wives' saving behavior provided that our exclusion restriction holds, i.e. that the polygamy status of the husbands' father does not have a differential impact over time on wives' savings strategies, other than through the risk of polygamy.

The first methodological problem that we encounter is that the risk for a union to become polygamous is not directly observed. We thus adopt a two-step strategy consisting first in (1) estimating a duration model at the union level for transitions from monogamy to polygamy and recovering the predicted risk of becoming polygamous, and (2) estimating the impact of this predicted risk of becoming polygamous on saving behaviors of individuals in the population at risk, i.e. women in monogamous unions, using the panel dimension of our data to control for individual and union unobserved heterogeneity. Our two-step approach to estimate probabilities for monogamous unions to become polygamous is related to the methodology used by Jacoby, Li, and Rozelle (2002) to study the impact of the risk of land expropriation on farmers' productive investments in rural China[5].

Section 3.1 and 3.2 present the two steps of our empirical strategy, and discuss identification issues.

3.1 First step: estimation of the risk of polygamy

We discuss here the first step of the analysis. The second step is presented in Section 3.2.

3.1.1 Estimation of the instantaneous hazard of polygamy by a survival model

To predict the risk of turning polygamous for individuals in monogamous unions, we estimate a duration model at the union level, on the pooled sample of monogamous and polygamous unions made of a husband and his sole or first-rank wife, in the first wave of the survey.

Before presenting our model and assumptions, we need to introduce some vocabulary of survival analysis. In our application, individuals in monogamous unions at time t are "at risk" of turning polygamous: the survival function $S(t)$ refers to the probability of being still monogamous at time t, while the failure function $F(t) = 1 - S(t)$ represents the probability

[5]Note however that their strategy in the second step is different from ours in that they do not exploit panel data, and identification solely relies on the exclusion of village dummies.

of becoming polygamous before time t. The hazard function θ_t refers to the instantaneous transition rate to polygamy at time t, conditional on survival until time t –i.e. conditional on monogamy until time t[6].

We first make the assumption that the instantaneous risk for a monogamous union to become polygamous at time t is the hazard rate, $\theta_{i,t}$ which depends on the characteristics of each spouse in union i and on the duration of the marriage t.

We choose to estimate a standard semi-parametric Cox model stratified by the polygamous status of the husband's father for the instantaneous risk of polygamy[7]. Such a stratified Cox model allows us to introduce more flexibility as regards the relationship between our second-step exclusion variable, the polygamy of the husband's father, and the risk of polygamy. The polygamy status of the husband's father is chosen as a stratification variable in our model, first because it is one of the strongest predictors of the risk of polygamy (see Table 10 in Appendix, column (3)) and second, because the time pattern of transitions to polygamy seems to differ depending on the husband's father polygamy status, as appears in Figure 1. Note however that we find similar second-step results with a basic non-stratified Cox model, as shown in Appendix (Table 12).

We assume that the instantaneous risk of polygamy for each union i is represented by the hazard function θ_i, which writes:

$$\theta_{i,z}(t, X_{i,1}) = \theta_{0z}(t) \cdot \exp(\gamma' X_{i,1}), \quad (z = 0, 1) \tag{1}$$

Where Z is the stratification variable ($Z = z$), which is equal to 1 if the husband's father is (or was if deceased) polygamous and 0 if monogamous. $\theta_{0z}(t)$ is the baseline hazard which is assumed to be specific to each strata z. $X_{i,1}$ is a set of time-invariant characteristics of the union and of each spouse determined at the time of marriage and not affected by post-marriage outcomes. In our main empirical specification, we control for both spouses' age at marriage, ethnicity, education, having been fostered before the age of 15, for the education and activity of both spouses' parents and for the location of the union (Dakar and other urban areas as opposed

[6]Note that the hazard rate is not a probability and can take any positive real value.

[7]As a robustness check, we estimate a more flexible Royston-Parmar model (Royston and Parmar, 2002) and find similar results, as shown in Appendix, suggesting that our results are not driven by the specification choice of the hazard function.

to rural areas). We also include in an alternative specification shown in Appendix, (Table 10, column (2) for step-1 results), the polygamy status of the wife's father, and the bride price and the amount spent by the wife's family for the wedding, that may be correlated with the bargaining power of the wife and thus affect the probability for the union to become polygamous. Since the inclusion of these variables reduces the sample size and does not significantly affect our results (step-2 results shown in Table 11, in Appendix), we choose not to include them in our main specification. The choice to include in the first step of our model only time-invariant variables pre-determined at the time of the marriage allows us first to avoid reverse causality issues. Second, this choice is partly constrained by our data which do not allow us in most cases to reconstruct retrospective information over the whole time-span of marriage as required by duration models. However, we relax this assumption which may seem overly restrictive and estimate an additional specification, in which we include a dummy variable which takes the value one for deceased husband's father as a time-varying variable likely to affect transitions to polygamy. Indeed, inheritance, and in particular housing inheritance, may help husbands to afford the cost of taking a second wife (Lambert, Ravallion, and van de Walle, 2014). In this specification, we thus exploit the additional information on both transitions from monogamy to polygamy and father's deaths between the two waves conveyed by the second survey wave, to predict the risk of transition to polygamy. The estimation sample is slightly reduced[8], due to missing information on the year of the death for some deceased fathers. We find similar second-step results[9] to those shown in Section 5, as regards the sign, size of the coefficient on the risk variable, and similar results in terms of coefficient significance in most specifications [10].

3.1.2 Prediction of the risk of polygamy

Based on equation (1), we predict for each union, at each survey wave, the failure function, which represents the probability to become polygamous before time t. The predicted failure function enables us to capture the accumulation over time of the instantaneous risks to become polygamous and is thus more adapted to the nature of the risk at stake here than the hazard rate. Indeed, we intend to estimate the risk of becoming polygamous, in order to assess the

[8] By around 100 observations at each wave.

[9] Not shown, available upon request.

[10] More precisely, only the coefficient on the predicted risk in the specification corresponding to second-step equation (5) is not significant any more, which may result from the reduced sample size.

impact of such a risk on saving decisions of spouses at risk. In this specific application, we argue that the failure function which is a cumulative distribution function, better captures the relevant perception of the risk of becoming polygamous in the near future, than the hazard rate, which may be interpreted in a continuous setting as the instantaneous transition intensity to polygamy at time t. Moreover, economic decisions, and saving decisions in particular, are likely to be made with a medium to long time horizon, rather than be sensitive to instantaneous risks. Finally, contrary to the hazard rate, the failure function is a probability, making the interpretation of the magnitude of the effects more intuitive.

The predicted failure function $\widehat{F_{i,zt}}$ is obtained for each union i from the predicted survival $\widehat{S_{i,zt}}$:

$$\widehat{F_{i,z}}(t, X_{i,1}) = 1 - \widehat{S_{i,z}}(t, X_{i,1}) = 1 - \widehat{S_{0z}}(t)^{exp(\widehat{\gamma}' X_{i,1})} \tag{2}$$

The predicted failure thus depends on the estimated stratified non-parametric baseline survival and the predicted hazard ratio depending on the characteristics $X_{i,1}$ of union i. This predicted variable $\widehat{F_{i,zt}}$ is then included as a regressor in our second-step resource allocation equations.

More specifically, the second step of our estimation strategy uses the two waves of the survey collected on average 4.3 years apart, and focuses on the subsample of unions that have remained monogamous. We are thus interested in the difference between the predicted failure function at the two survey dates $(\widehat{F_{w_2}} - \widehat{F_{w_1}})$, which represents the probability of becoming polygamous between the two survey waves, denoted respectively w_1 and w_2.

As noted above, the set of individual and union level characteristics $X_{i,1}$ only contains variables that are predetermined at the time of marriage. Both the predicted risk of becoming polygamous at time w_1 and at time w_2 are thus directly obtained from equation (1) estimated using the first survey wave only. By using the data from the first survey wave only to estimate the risk of becoming polygamous at both survey waves, we thus assume that the pattern of duration dependence and the determinants of polygamy do not change between the two survey waves, which does not seem unrealistic given that the average period between the two waves is about 4.3 years only.

Capturing the impact of the length of marriage on the risk of polygamy through estimated

failure rates rather than simply using marriage duration as observed in the data has three advantages. First, using observed marriage duration may lead to errors-in-variable problems as noted by Jacoby, Li, and Rozelle (2002). Indeed, the actual marriage duration is partly determined by a stochastic process and is subsequently a noisy indicator of the underlying uncertainty faced by monogamous wives as regards a potential transition to polygamy. Second, survival analysis allows us to account for data censoring, corresponding to the fact that some of the monogamous unions in our sample will actually become polygamous in the future but their transition is not observed yet, while we exploit the timing of the transition to polygamy of first-rank polygamous wives. In addition, this strategy allows for a flexible non-linear relationship between marriage duration and the probability for a union to turn polygamous, and accounts for the effect of observed individual and union characteristics on transition patterns.

In our second step, we thus exploit both the variability in the survey dates across households, and the fact that the increase in the predicted failure over the course of marriage is non-monotonous, meaning that we have enough variability across unions in the increase of our risk variable between the two survey waves, $\widehat{F_{i,zt}}$ as shown in Figure 2 in Appendix.

3.2 Second step: impact of the risk of polygamy on wives' resource allocation decisions

In the second step of our analysis we aim at identifying the impact of the risk of polygamy on resource allocation decisions of monogamous wives. We focus on the subsample of unions that remained monogamous between the two survey waves. We exploit the panel structure of our data by including union fixed-effect to cancel out the effect of time-invariant unobserved union characteristics on our outcome variables.

3.2.1 Empirical model

We estimate for each outcome the following baseline specification:

$$Y_{it} = \beta_0 + \beta_1 \widehat{F_{i,z}}(t, X_{i,1}) + \delta_1 t_i + \delta_2 t_i^2 + \alpha_i + \epsilon_{i,t} \tag{3}$$

Where the dependent variable Y_{it}, is the outcome decision considered –savings or consump-

tion choices– of the wife in union i, and is measured at time t, $t = w_1, w_2$. We exploit the variability across unions in the interval between w_1 and w_2, and control for the potential non-linear impact of time by including t_i, the amount of time (in months) elapsed between the two survey waves, and its square. α_i are union fixed-effects. $\widehat{F_{i,z}}(t, X_{i,1})$ is the predicted failure for the risk of becoming polygamous before time t, as defined in equation (2) and obtained from the survival analysis conducted in the first step. As exposed above, $\widehat{F_{i,z}}(t, X_{i,1})$ depends on the stratification variable Z_i, which is the polygamy status of the husband's father, on time t, and on time-invariant characteristics of the union $X_{i,1}$. Standard errors are bootstrapped to account for the extra-sampling variability induced by the inclusion of a predicted regressor in the model.

We enrich our baseline specification by controlling for time-variant union characteristics and estimate the following equation:

$$Y_{it} = \beta_0 + \beta_1 \widehat{F_{i,z}}(t, X_{i,1}) + \beta_2' X_{i,t} + \delta_1 t_i + \delta_2 t_i^2 + \alpha_i + \epsilon_{i,t} \tag{4}$$

Notations are the same as above, and $X_{i,t}$ refers to time-varying spouse or union characteristics of union i at time t, namely the household size, the share of dependents in the household, and dummies equals to one if the father of each spouse is deceased.

We finally estimate the following equation in which we allow all determinants of polygamy included in equation (1) to have a differential impact on economic outcomes Y_{it} over time :

$$Y_{it} = \beta_0 + \beta_1 \widehat{F_{i,z}}(t, X_{i,1}) + \beta_2' X_{i,t} + \beta_3' (X_{i,1} \times t_i) + \delta_1 t_i + \delta_2 t_i^2 + \alpha_i + \epsilon_{i,t} \tag{5}$$

In equation (5), we add to the set of controls of equation (4), the interaction between all the baseline controls $X_{i,1}$ that were included in the estimation of equation (1) and the time elapsed between the two survey waves t_i. Identification in this last specification relies on one exclusion restriction only: the exclusion of the interaction between time and our first-step stratification variable, the polygamy status of the husband's father. Identification assumptions are further discussed in the next subsection.

3.2.2 Identification assumptions and exclusion restrictions

The use of panel data with union level fixed effects allows us to identify the impact of a change in the risk of becoming polygamous, controlling for all time-invariant unobserved characteristics of spouses and unions likely to affect both their polygamy status and wives' saving decisions. Identification in the above three specifications thus relies on the standard panel fixed-effect assumption that no other time-variant characteristic than those included in the model is correlated with both the risk of turning polygamous and wives' saving decisions. More specifically, in equations (3) and (4), identification relies on the exclusion of the interaction of our first step time-invariant variables $X_{i,1}$ and Z_i with time. In other words, we make the assumption that all the variables that enter equation (1) as determinants of polygamy do not have a differential impact on resource allocation decisions over time, except through the risk of polygamy. Note however that this assumption does not imply that these variables $X_{i,1}$ and Z_i do not explain different allocation decisions, and in particular different savings level. We indeed control for the potential impact of all time-invariant individual and union characteristics on savings through union fixed-effects.

Our last specification, equation (5) relies on the sole exclusion of the interaction of the stratification variable Z_i with time. This exclusion restriction amounts to assuming that the polygamy status of the husband's father does not affect the wife's saving patterns over time, other than through the risk of polygamy. Given that we control for the interaction of the education of the husband, and the education and sector of activity of the husband's father, with time, this does not seem too strong an assumption.

Indeed, although the polygamy status of the father may induce different initial conditions in terms of wealth endowment (polygamy being often associated with a higher socio-economic status), this is captured by the union fixed-effects. Moreover, since we control for the interaction of proxies of socio-economic status such as the education of the husband, and the education and sector of activity of the husband's father, with time, we are likely to capture the potential differential effect over time of initial endowments on wives' saving decisions [11].

[11] This assumption is corroborated by additional findings shown in Section 5. We indeed explore the potential heterogeneity of the impact of the risk of polygamy on savings by estimating our second-step equations separately for unions living in households below and above the median level of per capita household expenditures, and find that the impact of our risk variable is significant for the poorest unions only. These findings seem to rule out the interpretation stating that our effects are driven by our risk variable capturing wealth.

Additionally, identification of the effect of the risk of polygamy further relies on the non-linearity of the failure function with respect to time and the husband's father polygamy status, the baseline survival function being estimated on each strata.

Note that since the failure function is a cumulative distribution function, for each union, the predicted risk mechanically increases between the two survey waves. One may be concerned by the fact that according to life-cycle theories individuals' saving capacity is also expected to increase over time (at least for active age individuals, which is the case for the largest part of our sample restricted to women aged 15 to 60 years). However, we argue that our second-step results are not driven by an omitted variable bias. Indeed, since we use panel data and estimate a model with union fixed-effects, we are interested in the impact of within-union variations in the risk of polygamy on the variation of savings. First, we actually control for time in our second-step equations by exploiting the variability in the time-span between both survey waves across households, and even allow for a non-linear impact of time on savings by including a squared term. Second, our data suggest that the positive within-union variation in the risk of polygamy between the two waves is uncorrelated with marriage duration, as shown in Figure 3.

Note in addition that we focus in this second step on wives' economic decisions. Indeed, as mentioned in Section 2, strong asymmetries of information exist between spouses as regards the potential arrival of a co-wife. Our approach in terms of risk of polygamy best applies to the wife, who has no say in her husband's decision to take a second wife, and is in general kept in the dark about the planning and timing of such an event. We thus focus our analysis on wives' economic decisions, in response to an increased risk of polygamy. However, we choose to show, in the last part of the following section, second-step results for male employment, savings and transfers as they help us to shed light on some of the mechanisms behind our results obtained for wives, but they should be interpreted with caution.

3.2.3 Sample selection

We are faced with a sample selection issue at the second stage of our analysis. Indeed, we focus on monogamous unions that have remained monogamous between the two survey waves. The obvious reason for this is that initially monogamous women whose union has become polygamous between the two waves, are not facing in the second wave the same incentives in terms of savings

and resource allocation than still monogamous wives. We thus need to consider the selection issue that may result from the use that we make of our panel data. Indeed, unions that are at a higher risk of becoming polygamous before the second wave, may also be at a higher risk not to be included in our regression sample, since all unions that became polygamous between the two survey waves are mechanically dropped from our second step regression sample. This strategy implies that we are estimating the impact of the risk of polygamy on a sample of unions that are on average facing a lower risk than our population of interest (monogamous wives), which we expect to downward bias our results. Note however that since we include union fixed effects, we control for any sample selection driven by time-invariant union characteristics. In the following section, we document the composition of our sample at both stages and provide summary statistics on the observed characteristics of unions dropped either due to attrition or because they became polygamous between the two survey waves. Our results suggest that attrited unions between the two waves and unions included in our second step regression sample are very similar as regards their observable characteristics.

Note that since we choose to focus on unions, we identify the effect of the risk of polygamy based on the sample of actual matches only. Since women who are the most polygamy-averse may have preferred to remain single, we are likely to obtain a lower bound estimate of the impact of the risk of polygamy on savings. However, staying single is really not an option for women in the Senegalese society where social status is highly correlated with marital status. This issue of social status is also related to the question of divorce as an exit option for monogamously married wives in case of the entry of a second wife in the union. While divorce is possible and relatively frequent in Senegal, a woman who chooses to divorce does not stay single for long, and is more likely to remarry as a second or higher-rank wife (Lambert, Villar, and de Walle, 2015), making divorce a very costly and inefficient strategy for monogamous wives who want to avoid polygamy.

4 Data

4.1 The PSF Individual Panel Survey

The data used in this paper come from an original household survey, "Poverty and Family Structure" (PSF), conducted in Senegal from 2006 to 2012[12]. The data were collected in two waves, in 2006 and 2007 for the first wave, and from late 2010 to mid 2012 for the second wave, constituting an individual panel. The data provide in particular detailed information on marital trajectories, savings and labor market participation at the individual level. The overall sample in the first wave is made of 1750 households and 14,450 individuals, in 150 randomly drawn census districts. In the whole sample, 57,1% of the individuals are living in a rural area, 48% are males and 95 % are Muslim. The average household size is between eight and nine members.

The PSF survey data are rich and unique in that they intend to account for the complexity of household structures in the Senegalese society. The questionnaire relies on the preliminary identification of household sub-structures, referred to as cells. Cells are defined as units that are semi-autonomous as regards resource allocation decisions, composed of a cell head and his or her direct dependents – and in particular children, foster children, or widowed mother or father. The average household is made of 2.4 cells of around 3 members each. Notably, expenditures data were collected at the cell level, with a particular attention to identify the expenditures that are specific to one cell, shared between two or more cells and shared by the whole household. This valuable and original feature of the data allows us to measure intra-household variations in consumption patterns and, in particular, differences between spouses. We will mainly rely on private consumption of the cell, meaning expenditures not shared between other cells. Moreover, wives of the household head were systematically recorded in two separate consumption cells while a men in the household who is not the head and whose wife lives also in the household will typically be recorded in the same cell. Hence, we will consider the sample of wives who are in a separate cell from their husband to be able to identify the impact of the risk of polygamy on the wives' consumption choices. A limit of this analysis to be kept in mind

[12]The survey has been conducted by a team of French researchers and researchers from the National Statistical Agency of Senegal and is described in detail in DeVreyer et al. (2008). Momar Sylla and Matar Gueye of the Agence Nationale de la Statistique et de la Démographie of Senegal (ANSD) on the one hand and Philippe De Vreyer (Paris-Dauphine Dauphine, IRD-DIAL), Sylvie Lambert (PSE) and Abla Safir (World Bank) designed the survey. The data have been collected by the ANSD thanks to the funding of the IDRC (International Development Research Center), INRA Paris and CEPREMAP.

is that the sample of these wives are not representative and since household heads are more likely to become polygamous, we will estimate on this sample a upper bound estimate.

The PSF data are also particularly suitable for this analysis since savings stock as well as the flows of transfers sent out and received from individuals out of the household in the past 12 months were collected at the individual level. We have detailed information about savings, notably we can distinguish between savings in formal institutions, informal associations, in Rotating Saving and Credit Associations (ROSCA, or *tontine* in Senegal) and savings held at home. For the value of savings held in ROSCA, we choose to rely on the sum of the contributions to the pot during the past 12 months[13]. Moreover, the survey collects detailed information on individual and household socio-demographic and economic characteristics and on family structure.

4.2 Descriptive statistics

Our sample of interest in the first step of our empirical analysis is composed of all co-resident monogamous and polygamous unions made of a husband and his only or first-rank wife. We restrict our sample to unions in which women are between 15 and 60 years old. The 60 unions with the husband being Christian are dropped from our sample, since these unions are not expected to face the same probability of becoming polygamous as Muslim ones. Our final sample for the first step of the analysis is thus made of 1388 unions surveyed in the first wave of the PSF survey.

Figure 4 in Appendix displays the age at the first and second marriage, computed from the subsample of 457 men living in a polygamous union (434 observations, once missing values on years of marriage are taken into account). We see that polygamous men got married around 25 years old and get remarried to second wife just before 40. Figure 5 in Appendix plots the time interval between the first and second marriages distinguishing between husbands whose father is/was polygamous and husbands whose father is/was monogamous. Notably, we see on this selected sample of polygamous men no difference across these two groups. The interval between the two waves ranges from 0 to 50 years. The average interval is 12 years and the median 10 years. The risk of polygamy decreases after 10 years and 75% of second marriages occurred in

[13]Results are robust to rely rather on the value of the pot or on the value of the pot divided by two –this is to capture the fact that on average, half of the pot is the results of savings and the other half of loan reimbursement (once the pot is received).

the first 16 years of the first union.

Table 7 in Appendix provides descriptive statistics of socio-economic characteristics of our first-step sample made of monogamous and polygamous-first-rank unions.

4.3 Panel sample and attrition

Table 8 in Appendix presents our second step regression sample made of monogamous unions in wave one that have remained monogamous and were surveyed in wave two. The characteristics of the 782 unions in our regression sample are compared to those of the 333 monogamous unions at wave one which are dropped, either due to survey attrition or because they had become polygamous at wave two. 138 initially monogamous unions were not surveyed in the second wave, for multiple reasons including international migration, death of both partners, or failure of the tracking process. Almost 100 unions became polygamous between the two waves, while the rest became widow or divorced in the interval. Investigating the difference in observed characteristics between the two samples we find only few notable differences: Pulaar unions as well as unions in larger households with more dependents are more likely to be part of the final sample, while unions from the region of Dakar are more likely to be dropped from the regression sample. We estimate a Probit model for the probability not to be part of the panel regression sample, on the sample of monogamous unions at wave 1, depending on our predicted risk of polygamy and individual and union characteristics. Results are shown in Table 9 in Appendix. We separately explore the determinants of the probability of exclusion from our second-step sample due to transitions to polygamy (column (1)), the probability of exclusion from our second-step sample due to other marital transitions than polygamy (widowhood or divorce) and survey attrition (column (2)), and finally, the probability of exclusion from our second-step sample due to widowhood and survey attrition (column (2)). Indeed, if as mentioned above, divorce is an exit option for wives in case of the arrival of a co-wife, our risk variable may be correlated with divorce between the two survey waves. Unsurprisingly, we find that our predicted risk variable is positively correlated with the probability of becoming polygamous between the two survey waves. However, the estimated risk of polygamy is not found to be significantly correlated with attrition in the last two columns. As for individual and union determinants of polygamy, we find that living in a rural area is negatively correlated attrition in columns (2)

and (3). The only significant coefficients in the last column are those on wife's father formal education, and minority ethnicity. Overall, this analysis suggests that the sample selection due to attrition or marital transitions other than polygamy, based on observable individual and union characteristics, is likely to be negligible, which does not solve the issue of selection based on unobserved characteristics. Since the coefficient on our variable of interest, the predicted risk of polygamy, is not significant in the last two columns, we are however reasonably confident that our second-step results presented in the following section are not affected by severe selection biases due to survey attrition or marital transitions other than transitions to polygamy. Other selection issues, due to our focusing on unions that remained monogamous between the two waves have been discussed in Section 3.2.3.

5 Results

5.1 First step: estimation of the risk of polygamy

We first estimate a Cox model, stratified by the polygamy status of the husband's father, for the risk of polygamy, as defined in equation (1). The survival function estimated for each strata is presented in Figure 1 and estimation results for the $X_i, 1$ variables are shown in Table 1. Hazard ratios (exponentiated coefficients) are reported. Hence, in Table 1, a coefficient larger than one means that the corresponding variable increases the likelihood of a transition to polygamy, while a coefficient smaller than one means that the corresponding variable decreases it.

Figure 1 suggests that there is no significant difference in the survival function for unions depending on the polygamy status of the husband's father during the first 10 years of marriage, while the gap widens and becomes statistically significant after 15 years of marriage. Unions with a polygamous husband's father are more at risk of becoming polygamous than those with a monogamous husband's father, consistent with the transmission of preferences for polygamy from father to son.

As shown in Table 1, we find that when the wife has been fostered in childhood, the risk for the union to become polygamous is about 30% lower, whereas when the husband has been fostered in childhood, the risk of polygamy increases by 58% for men. A possible explanation is that girls are often fostered in the household of their future husband and therefore develop

Table 1: First-step estimation results for the risk of polygamy

Hazard ratio estimates from a stratified Cox model for transitions to polygamy

Wife controls	
Age at marriage	0.977
	(0.018)
Serere ethnicity	0.630
	(0.257)
Pulaar ethnicity	1.036
	(0.385)
Minority ethnicity	1.062
Ref: Wolof ethnicity	(0.334)
Fostered before 15	0.668**
	(0.124)
No formal education	1.709**
	(0.416)
Secondary education or higher	1.350
Ref: Primary education	(0.487)
Husband controls	
Age at marriage	0.969***
	(0.011)
Serere ethnicity	0.974
	(0.393)
Pulaar ethnicity	0.636
	(0.238)
Minority ethnicity	0.733
Ref: Wolof ethnicity	(0.235)
Fostered before 15	1.581***
	(0.205)
No formal education	1.298
	(0.257)
Secondary education or higher	1.005
Ref: Primary education	(0.294)
Union controls	
Dakar region	0.833
	(0.147)
Other urban area	0.729*
Ref: Rural area	(0.135)
Additional controls†	Yes
Number of observations	1356

Semi-parametric Cox proportional hazard model stratified by the polygamy status of the husband's father; exponentiated coefficients are presented (hazard ratios); robust standard errors in parentheses

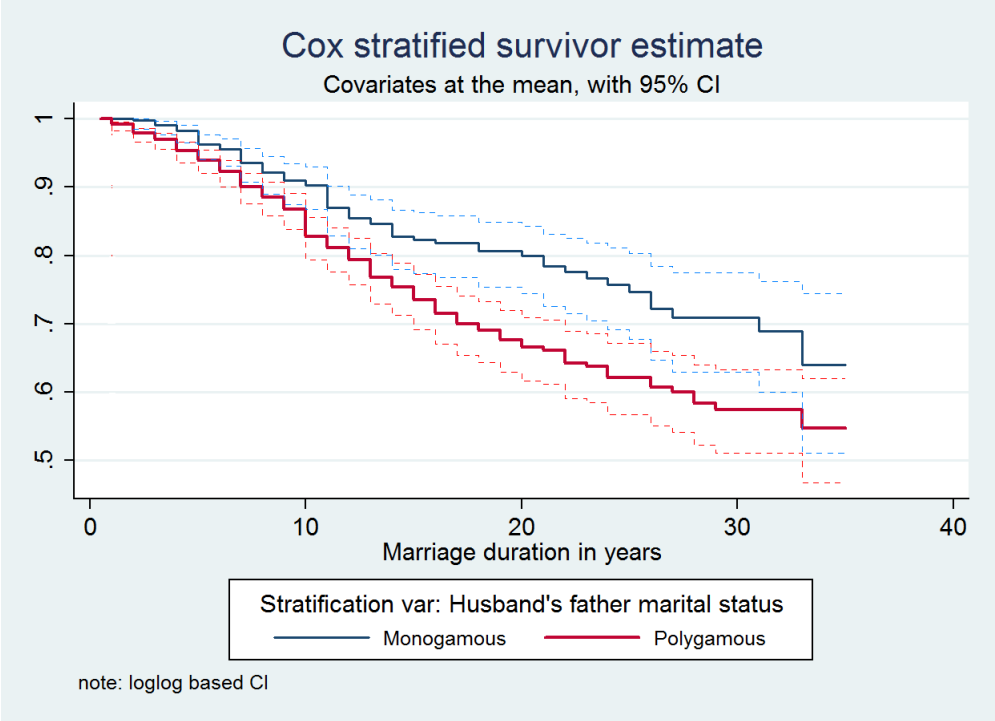
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The estimation sample includes all monogamous unions and polygamous unions made of husband and first-rank wife aged 15 to 60, in the first wave of the PSF Survey.

† Additional controls include dummies for Koranic education of both spouses' parents, and for formal education and sectors of activity of both spouses' fathers.

Data source: PSF Survey, wave 1 (2006-2007)

Figure 1: Survival estimate from the Cox stratified model



strong ties with their mother-in-law, which may help to delay or avoid the arrival of a second wife. In addition, having no education is found to accelerate transitions to polygamy especially for wives. Living in urban areas decreases the risk of becoming polygamous by 27%, which could partly be due to the a greater persistence of traditions and a lower land pressure in rural areas, allowing for the accommodation of larger households.

Alternative specifications are presented in Table 10 in Appendix. Coefficients are found to be remarkably stable across specifications. Column (1) is our main specification, also reported in Table 1. In column (2), additional controls are included : a dummy equal to one if the wife's father is polygamous and the amount of the bride price and dowry. We find that the polygamy of the wife's father is also positively correlated with the risk of polygamy while the bride price (paid by the husband) is negatively correlated with the risk of polygamy. This finding may suggest that the bride price partly reflects the bargaining power of the wife. However, the inclusion of these variables slightly reduces our sample size, without altering our second step estimation results (as shown in Appendix). In column (3), the Cox model is not stratified and the polygamy status of the husband's father is added to the set of regressors. All else equal, the husband's father being polygamous increases the risk for the union of becoming polygamous by

43% at each marriage duration. Finally, in column (4), we estimate a flexible parametric model as described in Royston and Parmar (2002), and find similar results. We test the robustness of our second step estimation results to first-step specification choices in Appendix.

5.2 Second step: Impact of the risk of polygamy on wives' saving decisions

In the second step of our empirical analysis, we estimate the impact on wives's saving decisions of the risk for each monogamous union to become polygamous, based on the Cox estimates obtained in the first step, as presented in Table 1. More specifically, we predict for each union, the value of the failure function, depending on the union duration t_i and other observed time-invariant characteristics $X_{i,1}$, and a stratification variable, Z_i, i.e. the polygamy status of the husband's father, based on specification (1), estimated in Table 1. In order to assess the impact of the risk of polygamy, we focus on the panel of unions which are present in both survey waves and remain monogamous. Estimation results of the impact of the risk of polygamy on wife savings are presented in Table 2. We present in Panel A, B and C respectively the estimation results of equations (3), (4), and (5). All specifications include union fixed-effects, the number of months elapsed between the two survey waves, t_i, and its square, t_i^2. In addition to these controls, we include in Panel B time-varying union characteristics, $X_{i,t}$ that may affect both the probability of polygamy and resource allocation decisions, such as the household structure and whether each spouse's father is deceased. The specification shown in Panel C additionally includes the first-step time-invariant controls $X_{i,1}$ interacted with the time elapsed between the two survey waves t_i.

We first explore the impact of polygamy on the stock of total wife's savings (in log) in column (1), entrusted to institutions, including both formal savings and participation in ROSCAs[14] or other informal savings associations (column (2)), or kept at home (column (3)). Columns (4) to (6) investigate the extensive margin, and the dependent variable is a dummy equal to one if the wife has savings of any kind (column (4)), entrusted to institutions(column (5)), and kept at home (column (6)). By looking separately at different kinds of savings, we intend to investigate the potential impact of the risk of polygamy on wives' strategic behaviours, especially whether

[14]Savings held in ROSCAs are taken into account as the sum of the contributions to ROSCAs over the last 12 months. Results are unchanged if we rather consider the value of the pot or the value of the pot divided by two (to account for the fact that, on average, half the value of the pot has been saved while the other half is a loan). Results are available upon request.

Table 2: Impact of the risk of polygamy on wives' savings
Panel fixed effect estimation

	(a)			(b)			(c)
	Savings stock (in log)			**Has savings (dummy)**			**Share in**
	Total	Institutions	At home	Total	Institutions	At home	institutions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: equation (3), incl. time, t and t^2, union FE†							
Estimated risk of polygamy, $\widehat{F}_t$	12.078*	13.839**	2.167	1.474**	1.650***	0.437	0.310
	(6.188)	(6.008)	(3.389)	(0.595)	(0.577)	(0.379)	(0.248)
Number of observations	1548	1548	1548	1548	1548	1548	1522
Number of unions	774	774	774	774	774	774	761
Within R2	0.011	0.011	0.029	0.017	0.015	0.034	0.84
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡							
Estimated risk of polygamy, $\widehat{F}_t$	14.417**	17.172**	0.801	1.499**	1.776***	0.317	0.415*
	(7.179)	(6.847)	(3.658)	(0.686)	(0.654)	(0.401)	(0.240)
Number of observations	1482	1482	1482	1482	1482	1482	1462
Number of unions	741	741	741	741	741	741	731
Within R2	0.021	0.024	0.052	0.026	0.027	0.058	0.84
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t, and t^2, union FE⋆							
Estimated risk of polygamy, $\widehat{F}_t$	14.649*	15.756**	-2.399	1.665**	1.767**	-0.070	0.403
	(8.070)	(7.894)	(4.349)	(0.778)	(0.754)	(0.459)	(0.345)
Number of observations	1482	1482	1482	1482	1482	1482	1462
Number of unions	741	741	741	741	741	741	731
Within R2	0.063	0.060	0.091	0.071	0.068	0.097	0.84
Unconditional mean (wave 1)	3.94	3.76	0.47	0.38	0.36	0.05	0.35

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p<0.12 * p<0.10, ** p<0.05, *** p<0.01.
Dependent variables: col (a): stock of savings of the wife (in log); col. (b): a dummy equal to one if wife has savings, col. (2) and (5) correspond to savings entrusted to informal or formal institutions, col. (3) and (6) to savings kept at home. In col. (7): Share of the total stock of savings entrusted to informal or formal institutions
Sample: monogamous unions in the two waves.
$\widehat{F}_t$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
⋆ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
In col. 7: we additionally control for the total level of savings in log
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

wives try to keep their savings out of the reach of their husband when facing a higher risk of polygamy. In the last column (7), the dependent variable is the share of total savings entrusted to institutions, as opposed to savings kept at home.

Our main variable of interest is the estimated failure probability $\widehat{F}_t$, which is assumed to capture the risk for a union to become polygamous at different marriage durations (i.e. at each survey date).

We find that a higher risk of polygamy has a positive impact on both wives' stock of savings and their probability to save. Results are found to be remarkably stable across specifications. The predicted risk of polygamy lies between 0 and 1, hence, based on Panel C results, an increase of 1 percentage point in the predicted risk of polygamy leads to an increase in the stock of savings of around 14.6%. This represents an increase of 9,800 FCFA out of an average stock of savings of 67,102 FCFA[15]. As for saving propensity, a 1% increase in the predicted risk leads to an increase in the propensity to save of 1.7 percentage points, representing a 4.5% increase in the baseline saving propensity for monogamous wives. Notably, we observe that this increase in savings is totally driven by savings entrusted to institutions, since no effect is found on savings kept at home. Consistent with this result, the share of savings held in institutions increases with the risk of polygamy, though not significantly at conventional levels in Panels A and C. This finding is in line with the hypothesis that wives facing a higher risk of polygamy have incentives to increase their precautionary savings, provided that they can secure their savings out of the reach of their husband.

Our results are robust to changes in specifications and to the estimation of a flexible parametric Royston-Parmar model instead of a Cox model in the first step (Royston and Parmar, 2002)[16].

We subsequently investigate potential heterogeneities in the impact of the risk of polygamy on women's savings, depending on household income. Indeed, as exposed in Section 2, we expect women to increase their precautionary savings when faced with a higher risk of arrival of a co-wife, most likely perceived as a negative shock. However, this effect will not necessarily be equal across the income distribution. Since individuals in richer households are more likely to have access to formal insurance or borrowing devices, the precautionary motive for saving

[15] 1000 FCFA = 1.5 EUR.
[16] See Tables 11, 12, and 13 in Appendix.

may be more important for women in relatively poor households. We explore this issue by estimating separately equations (3) to (5) for wife's savings on the subsamples of monogamous unions in households below and above the median per capital level of household expenditures[17]. Results are shown in Table 3, in columns (1) to (3) for the poorest unions and columns (4) to (6) for unions above the median. Consistent with results shown in Table 2, we find that an increase in the risk of polygamy leads to a higher probability for women to save, out of home only. However, this impact is significant only for women living in the poorest households. These results thus give credence to the precautionary motive for savings. Moreover, they allow us to be confident that our results are not driven by our risk variable capturing wealth, as could be argued based on our identification assumption relying on the exclusion of the polygamy status of the husband's father from our second step equation (see discussion of identification issues in Section 3.2.2).

5.3 Mechanisms

Going one step further, we are interested in understanding the mechanisms behind saving decisions in response to a higher risk of polygamy. We intend to investigate the following questions: how are wife and husband consumption choices affected? How do wives afford to save more? Do wives prepare their exit option and invest more in their social network through larger interpersonal transfers? How is the risk of polygamy correlated with husbands' saving and work decisions?

5.3.1 Household food consumption and cell non-food consumption levels

As noted above, a unique feature of the PSF data is that information on consumption is available at the cell level, defined as household consumption subunits[18]. Note that the definition of cells has no impact on the measurement of savings, nor on labor or income, since information on

[17]The level of household expenditures is here classically preferred to household income as a proxy for socioeconomic status.

[18]The definition of cells used in the survey implies that the household head and her or his spouse(s) are always part of different cells. However, monogamous husbands who do not head their household are part of the same cell as their wife, implying that we cannot separately observe the consumption decisions of the two spouses. In what follows, we show results on the total sample of monogamous wives, either sharing their husband's cell of being in a separate consumption cell, to maximize our sample size. However, we test the robustness of our results on the subsample of wives in separate cells, i.e. wives of the household head and find similar results (available upon request).

Table 3: Impact of the risk of polygamy on wives' savings below and above median household expenditures
Panel fixed effect estimation

Wife's savings (dummy)	**Below median**			**Above median**		
	Total	Institutions	At home	Total	Institutions	At home
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: equation (3), incl. time, t and t^2, union FE†						
Estimated risk of polygamy, $\widehat{F}_t$	1.868**	2.013**	0.229	0.821	1.035	0.454
	(0.917)	(0.907)	(0.426)	(1.025)	(0.996)	(0.728)
Number of observations	760	760	760	788	788	788
Number of unions	380	380	380	394	394	394
Within R2	0.039	0.037	0.063	0.0049	0.0037	0.015
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, FE‡						
Estimated risk of polygamy, $\widehat{F}_t$	1.736*	2.069**	0.133	0.921	1.190	0.277
	(0.982)	(0.945)	(0.475)	(1.041)	(1.017)	(0.749)
Number of observations	726	726	726	756	756	756
Number of unions	363	363	363	378	378	378
Within R2	0.048	0.045	0.10	0.041	0.042	0.052
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t and t^2, union FE*						
Estimated risk of polygamy, $\widehat{F}_t$	1.933^{+}	2.076*	-0.536	1.402	1.301	0.370
	(1.243)	(1.215)	(0.618)	(1.458)	(1.366)	(0.940)
Number of observations	726	726	726	756	756	756
Number of unions	363	363	363	378	378	378
Within R2	0.13	0.12	0.18	0.12	0.12	0.12
Unconditional mean (wave 1)	0.34	0.33	0.33	0.43	0.41	0.41

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p<0.12 * p<0.10, ** p<0.05, *** p<0.01.
Dependent variables: col. (1) and (4): a dummy equal to one if wife has savings, col. (2) and (5) a dummy equal to 1 if wife has savings entrusted to informal or formal institutions, col. (3) and (6) a dummy equal to 1 if wife has savings held at home.
Sample: Col. (1) to (3): monogamous unions in the two waves, below median household per capita expenditures. Col. (4) to (6), monogamous unions in the two waves, above median household per capita expenditures
$\widehat{F_t}$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

consumption only is collected at the cell level, while all other information is obtained at the individual level.

We thus additionally analyze the impact of the risk of polygamy on the level of household food consumption per capita for all monogamous unions and cell non-food expenditures, as well as the contributions of both husband and wife to cell expenditures.

Table 4: The risk of polygamy and the level of food and non-food consumption
Panel fixed effect estimation

	Household (food)	**Cell (non-food)**				
			Wife contribution		Husband contribution	
	Amount (p. cap. in log) (1)	Amount (p. cap. in log) (2)	Amount (p. cap. in log) (3)	Share (4)	Amount (p. cap. in log) (5)	Share (6)
Panel A: equation (3), incl. time t and t^2, union FE†						
Estimated risk of polygamy, $\widehat{F}_t$	-3.062***	-4.696^{+}	16.150***	0.903**	11.783*	0.925*
	(0.849)	(2.949)	(6.269)	(0.410)	(6.251)	(0.502)
Number of observations	1532	1548	1548	1458	1548	1548
Number of unions	766	774	774	729	774	774
Within R2	0.019	0.016	0.056	0.011	0.016	0.15
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡						
Estimated risk of polygamy, $\widehat{F}_t$	-2.140***	-3.650	16.805**	0.870*	17.631**	1.072*
	(0.716)	(2.978)	(6.810)	(0.482)	(6.851)	(0.563)
Number of observations	1470	1482	1482	1396	1482	1482
Number of unions	735	741	741	698	741	741
Within R2	0.10	0.024	0.066	0.018	0.025	0.16
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t and t^2, union FE*						
Estimated risk of polygamy, $\widehat{F}_t$	-1.779*	-6.381*	1.429	-0.155	16.452*	1.484*
	(0.922)	(3.466)	(8.397)	(0.613)	(9.466)	(0.769)
Number of observations	1470	1482	1482	1396	1482	1482
Number of unions	735	741	741	698	741	741
Within R2	0.15	0.058	0.13	0.097	0.060	0.21
Unconditional mean (wave 1)	11.8	10.3	4.40	0.25	8.04	0.61

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p<0.12, * p<0.10, ** p<0.05,*** p<0.01.
Dependent variables: col (1): Level of per capita household food consumption (in log); col. (2): Level of per capita cell non-food consumption; col. (3): Level of per capital cell non-food consumption funded by the wife (in log), col (4.) share of cell non-food consumption funded by the wife; col. (5): Level of per capital cell non-food consumption funded by the husband (in log), col (4.) share of cell non-food consumption funded by the husband.
Sample: monogamous unions in the two waves;
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents.
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 4 presents the effect of the predicted risk of polygamy on the level of household per capita food expenditures (column (1)), on the level of per capita non-food expenditures of the wife's cell (column (2)), on the level (col. (3)) and share (col. (4)) of the wife's contribution to the per capita non-food expenditures of the her own cell, and on the level (col. (5)) and share

(col. (6)) of the husband's contribution to the per capita non-food expenditures of the wife's cell[19]. We find that a higher risk of polygamy is associated with a significant and substantial decrease in the level of household per capita food consumption: according to Panel C estimates, a 1 percentage point increase in the risk of polygamy leads to a decrease of 1.8 percentage points in household per capita food consumption, which represents an average decrease of 3,600 FCFA per capita, i.e. 39,600 FCFA for an average household of 11 members, over the past 12 months. As for non-food cell consumption, we find that an increase in the risk of polygamy leads to a decrease in the total per capita amount (though not significant in all specifications), while the contribution of the husband to the expenditures of his wife's cell increases, both in amount and share. The positive effect of the risk of polygamy on the wife's contributions in Panel A and B disappears in Panel C, when controlling for the potentially differential impact of step-1 control variables over time. We thus find a clear negative impact of the risk of polygamy on consumption, in terms of both household food expenditures and wife private non-food consumption. These results, again, clearly suggest that the positive impact of the risk of polygamy on savings presented above cannot be explained by our risk variable capturing wealth. The increased savings of wives faced with a higher risk of polygamy thus seem to be made at the expenses of both food and non-food expenditures. Moreover, when investigating the potential heterogeneity of the impact of the risk of polygamy on household and wives' consumption choices with respect to income, we find that results on consumption are driven by unions in the lowest part of the distribution, in terms of household per capita expenditures[20], consistent with the above results on savings.

5.3.2 Wives' non-food consumption choices

We investigate in this section the impact of the risk of polygamy on non-food expenditures of the wife's cell[21]. We thus estimate the same equations (3) to (5), as for previous outcomes, controlling in addition for the level of non-food expenditures in the wife cell, so as to estimate Engel curves of spending choices. For the sake of simplicity, we choose to present estimation

[19] Note that at wave 1, the average shares of cell non-food expenditures contributed by the wife and the husband are respectively 25 and 61%, the remaining share being contributed by other household members or individuals out of the household.

[20] Results not shown, available upon request.

[21] As noted in footnote 16, women who are not married to the household head are in the same cell as their husband. We choose to show in Table 5 results on the total sample of monogamous wives, however, our results are robust to the restriction to wives of the household head, who are in separate consumption cells.

Table 5: The risk of polygamy and the level of non-food expenditures per type of commodities of wives
Panel fixed effect estimation

Estimation of equation (5), incl. 1st-step controls, × time $X_1 \times t$, and X_t, t, t^2, union FE*

Level of cell non-food expenditures (in log) per commodity type	Clothing (1)	Personal care (2)	Furniture (3)	Phone (4)	Education (5)	Transport (6)	Other (7)
Part 1: Total level of cell non-food expenditures							
Estimated risk of polygamy, $\widehat{F}_t$	2.386	-7.895	-20.814***	2.215	12.056*	-8.152	-12.605**
	(5.529)	(5.537)	(7.711)	(7.371)	(6.659)	(8.486)	(4.971)
Number of observations	1482	1478	1482	1478	1482	1482	1482
Number of unions	741	739	741	739	741	741	741
Within R2	0.076	0.081	0.47	0.13	0.14	0.17	0.085
Unconditional mean (wave 1, in FCFA)	46723.4	25307.3	2289.2	9376.8	9483.7	11055.5	11055.5
Part 2: Level of expenditures funded by the wife							
Estimated risk of polygamy, $\widehat{F}_t$	-9.387	3.358	-2.395	2.698	-6.635*	-2.327	-0.852
	(7.152)	(8.529)	(3.260)	(6.648)	(3.991)	(6.924)	(2.616)
Number of observations	1478	1478	1478	1478	1478	1478	1482
Number of unions	739	739	739	739	739	739	741
Within R2	0.100	0.092	0.044	0.096	0.044	0.11	0.051
Unconditional mean (wave 1, in FCFA)	7202.7	13167.5	792.1	2818.6	1200.9	3613.3	3608.4
Part 3: Level of expenditures funded by the husband							
Estimated risk of polygamy, $\widehat{F}_t$	18.598**	-7.901	-11.289**	12.962**	18.926***	-1.576	-5.797^{+}
	(8.628)	(7.953)	(4.839)	(6.281)	(6.845)	(8.090)	(3.547)
Number of observations	1478	1478	1478	1478	1478	1478	1482
Number of unions	739	739	739	739	739	739	741
Within R2	0.058	0.089	0.073	0.080	0.062	0.073	0.082
Unconditional mean (wave 1, in FCFA)	33916.8	11893.9	1004.0	5578.1	7360.0	6381.1	6372.4

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); * p<0.10, ** p<0.05,*** p<0.01
Dependent variables: Level of cell non-food per capita expenditures per type of commodities
Sample: monogamous wives in the two waves
$\widehat{F}_t$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1)
All regressions include union fixed-effects
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
In all columns, we control for the level of non-food consumption (in log)
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

results of equation (5) only, in Table 5. The dependent variables in the different columns represent the levels of expenditures on different items for the wife's cell. In the first part of the table the dependent variables are the total level of non-food expenditures of the wife's cell, and in Part 2 and 3, the dependent variables are the level of cell non-food expenditures funded by the wife and the husband, respectively. Part 1 results show that the cell level consumption choices of women faced with a higher risk of becoming polygamous changes, with larger amounts spent on the education of their children: we find that a 1 percentage point increase in risk of polygamy leads to an increase of the wife's cell expenditures devoted to the education by 12%. Interestingly, Part 2 and 3 results show that this increase is only funded by the husband's contributions, while the level of expenditures on education financed by the wife decreases by about 7%. We also find that the risk of polygamy is correlated with an increase in the level of expenditures on clothing of the wife's cell funded by the husband[22].

Our results on consumption choices at the wife's cell level are thus consistent with self-protective strategies consisting for women in investing in their children's education, in anticipation of the arrival of a co-wife. However, we find that the increase in education expenditures is caused by an increase in the husband's contribution, while the contribution of the wife decreases. We find, similarly, that the contribution of the husband to the wife's cell expenditures on clothing increases, while the total level of expenditures remains unchanged and the wife's own contribution decreases (though not significantly)[23]. These latter results seem to give credence the offensive strategies aimed at leading husbands to spend more so as to reduce their saving capacity, as described in Antoine (2002), combined with self-protective strategies.

5.3.3 Labor and transfers

In Table 14 in Appendix, we study the link between the risk of polygamy and the amount of labor supplied by both spouses, more specifically the number of weeks worked in the past 12 months. The coefficient on the risk variable is negative but not significant for women, for both the number of weeks worked and the level of earnings. However, we find a weakly significant and negative impact of our risk variable on wives' probability to earn any income over the past

[22] As noted above, results on male outcomes should be interpreted cautiously since the husband is the one who decides on the potential arrival of a second wife.

[23] Again, these results are driven by unions in the poorest households. Separate results for unions in households under and above the median per capita expenditures are available upon request.

12 months: wives facing a 1 percentage point increase in the risk of becoming polygamous are found to be 1.4% less likely to have earned any income in the past 12 months. As for husbands, we find a positive correlation between the risk of polygamy and the number of weeks worked, however the strong positive effect on earnings in Panels A and B is not significant anymore in Panel C.

In Table 15 in Appendix, we explore the correlation between husbands' saving decisions and the risk of polygamy. While we find some positive correlations in Panels A and B between the probability of polygamy and savings, these results do not hold in Panel C, the sign being even reversed.

Table 6: The risk of polygamy risk and spouses' transfers, received and sent, out of the household

	Wife						Husband	
	Transfers sent			Transfers received			Transfers sent	
	To anyone		To kin	From anyone		From kin	To anyone	
	Amount (log)	Dummy	Dummy	Amount (log)	Dummy	Dummy	Amount (log)	Dummy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: equation (3), incl. time, t and t^2, union FE†								
Estimated risk of polygamy, $\widehat{F}_t$	12.101*	1.165*	0.682	4.672	0.901	0.803	18.066**	2.058***
	(6.337)	(0.691)	(0.698)	(7.402)	(0.634)	(0.596)	(7.358)	(0.777)
Number of observations	1548	1548	1546	1542	1548	1546	1414	1414
Number of unions	774	774	773	771	774	773	707	707
Within R2	0.076	0.088	0.049	0.071	0.063	0.059	0.089	0.10
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡								
Estimated risk of polygamy, $\widehat{F}_t$	13.430*	1.267^{+}	0.844	4.904	0.877	0.801	19.849***	2.239***
	(7.228)	(0.777)	(0.744)	(7.507)	(0.711)	(0.652)	(7.209)	(0.751)
Number of observations	1482	1482	1480	1476	1482	1480	1396	1396
Number of unions	741	741	740	738	741	740	698	698
Within R2	0.081	0.092	0.058	0.071	0.062	0.058	0.11	0.12
Panel C: equation (5), incl. 1st-step controls $\times$ time $X_1 \times t$, X_t, t, and t^2, union FE*								
Estimated risk of polygamy, $\widehat{F}_t$	13.430*	1.267^{+}	0.844	4.904	0.877	0.801	19.849***	2.239***
	(7.228)	(0.777)	(0.744)	(7.507)	(0.711)	(0.652)	(7.209)	(0.751)
Number of observations	1482	1482	1480	1476	1482	1480	1396	1396
Number of unions	741	741	740	738	741	740	698	698
Within R2	0.081	0.092	0.058	0.071	0.062	0.058	0.11	0.12
Unconditional mean (wave 1)	3.72	0.38	0.30	2.35	0.23	0.21	4.19	0.41

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications);$^{+}$ p<0.12 * p<0.10, ** p<0.05, *** p<0.01.
Dependent variables: transfers sent and received from individuals out of the household over the past 12 months.
Sample: monogamous unions in the two waves.
$\widehat{F}_t$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents.
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Finally, we investigate in Table 6 whether spouses who are more at risk of polygamy rely

more on their social network outside the household. We focus in the first 6 columns on transfers received and sent by monogamous women, over the past 12 months. We find a robust and significant positive effect of the risk of polygamy on transfers sent, at both the extensive and intensive margins, but not on transfers received. Similar results are obtained for transfers from or to wives' kin, although coefficients are not statistically significant at conventional levels.

As for husbands, we find in the last two columns a positive and significant correlation between the risk of polygamy and both the probability to send transfers and amounts transferred.

Results on male outcomes are consistent with a strategy consisting in accumulating more resources through an increased labor supply, and increased savings (though our results on savings are not significant at conventional levels for men) when planning to take a second wife. Men are also found to transfer more out of their household, possibly to the future second wife or her family. As for monogamous wives, we find only weak evidence that an increase in the risk of polygamy leads them to reduce their labor supply and strong evidence that they invest more in their social networks when faced with a higher risk of polygamy.

6 Conclusion

This paper is the first to investigate the impact of the anticipation or threat of polygamy on economic decisions of monogamous women. We thus intend to contribute to the scarce economic literature on polygamy by exploring a new channel for the impact of polygamy on saving decisions based on the strategic behaviors of monogamous wives at risk of polygamy, who constitute a large population in countries where polygamy is legal.

In the first step of our empirical strategy, we estimate a semi-parametric Cox model stratified by the polygamy status of the husband's father, and predict the risk of a monogamous union to become polygamous. We then use this prediction to estimate the impact of the risk of polygamy on saving behaviors of monogamous wives. The use of panel data with union level fixed effects allows us to identify the impact of a change in the risk of becoming polygamous, controlling for all time-invariant and numerous time-varying characteristics likely to affect both the risk of polygamy and wives' saving decisions. The identification of the effect of the risk of polygamy relies on the exclusion in the second step estimation of the interaction between the polygamy status of the husband's father and time, controlling for the education of each spouse and their

parents as well as the sector of activity of the fathers, all interacted with time.

We find that wives with a higher risk of polygamy save more, but only in formal or informal institutions, out of the household. Moreover this effect is significant for wives living in households under the median, in terms of household per capita expenditures. This latter finding supports the assumption that when faced with a negative income shock, women at risk of polygamy have incentives to increase their precautionary savings, especially if they have a limited access to alternative insurance opportunities. Women faced with a larger increase in the risk of becoming polygamous are also found to transfer more to members of their social network out of the household and spend a larger share of their non-food expenditures on the education of their children. Our results suggest that such a reallocation of wives' resources to savings out of home, and investment in education and their social network, is made possible by a reduction of both household food consumption and wives' non-food private consumption and an increase in husbands' contributions to their wife's non-food private consumption, especially in education and clothing. Note, in addition, that we have no information in our data on non-earmarked transfers within the household, and in particular from husband to wife, which may be an additional source of savings to wives. While no effect of the risk of polygamy is found on monogamous wives' labor supply, a positive correlation is found for husbands: those facing a higher risk work and earn more. These results are consistent with an accumulation strategy for the husband to afford taking a second wife. Our findings suggest that monogamous wives anticipate the risk of polygamy by engaging in self-protective strategies.

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7 Appendix

Figure 2: Distribution of the variation of the estimated failure probability between the two waves

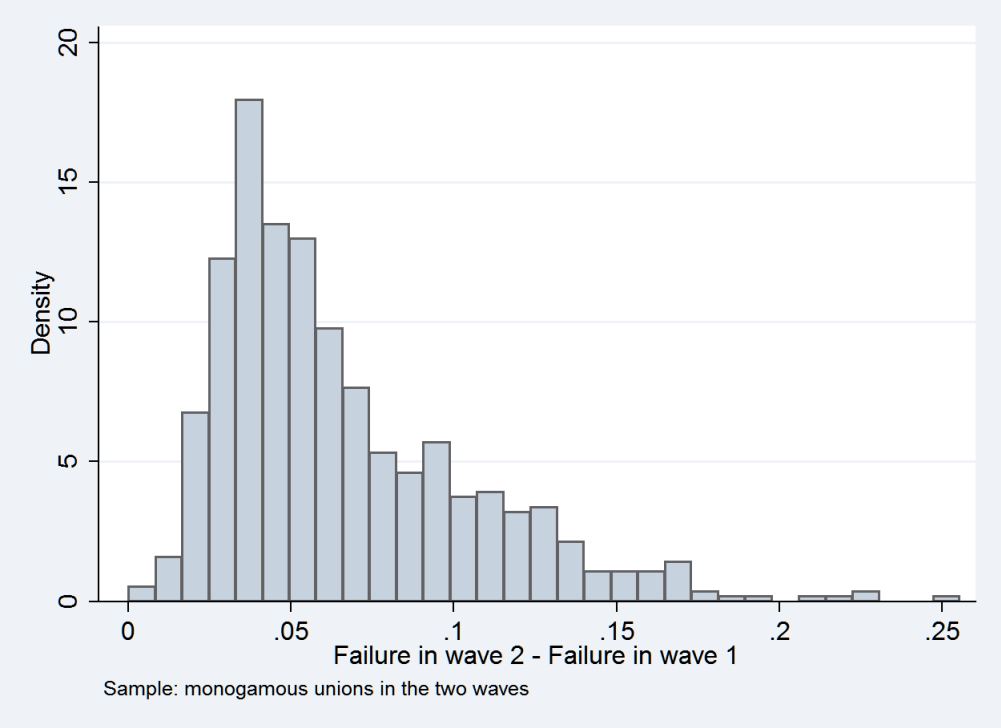

Figure 3: Variation of the predicted probability between the two waves by marriage duration

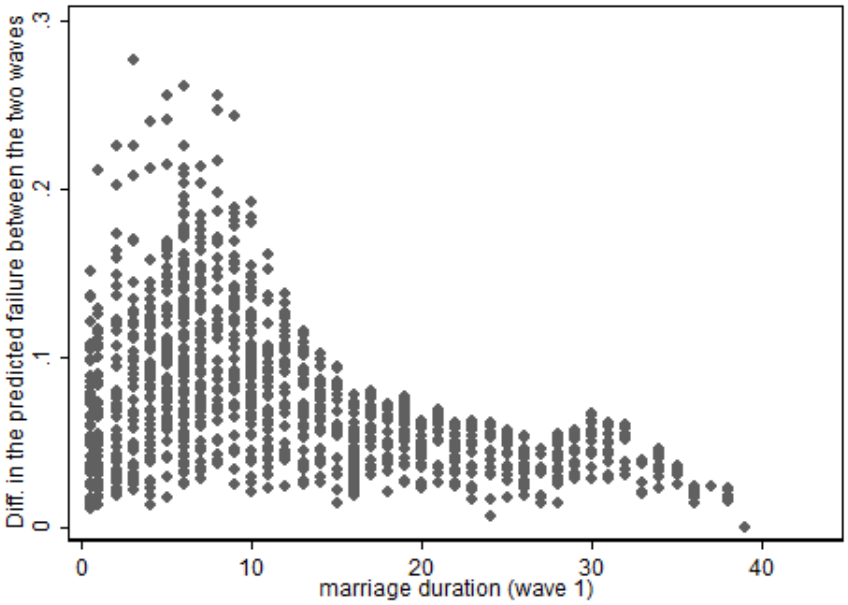

Figure 4: Age at the first and second marriages for 20-60 year-old polygamous men

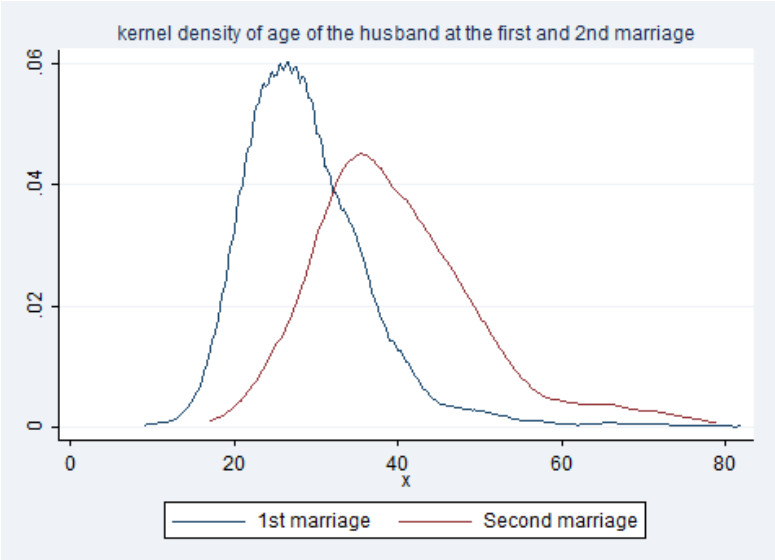

Figure 5: Interval between 1st and 2nd marriage by the polygamy status of the husband's father

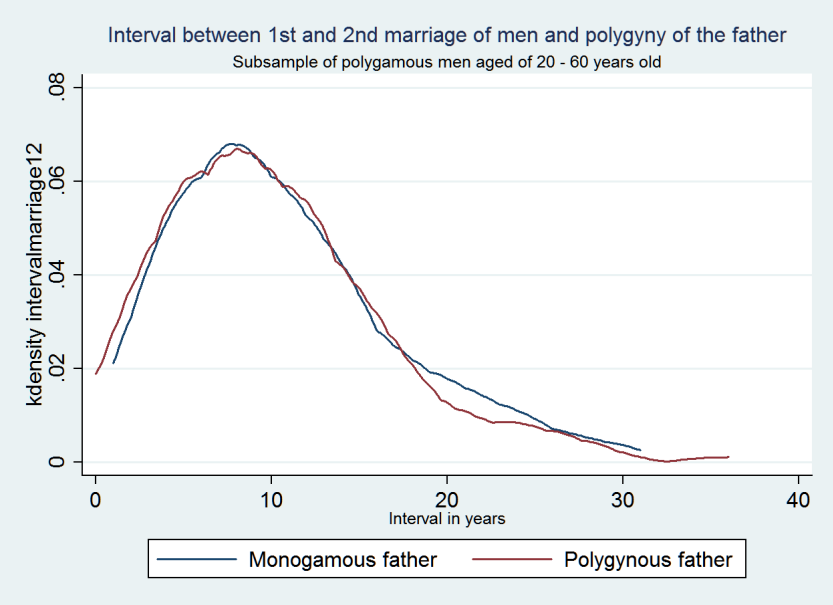

Figure 6: Non-parametric Kaplan-Meier failure and hazard estimates

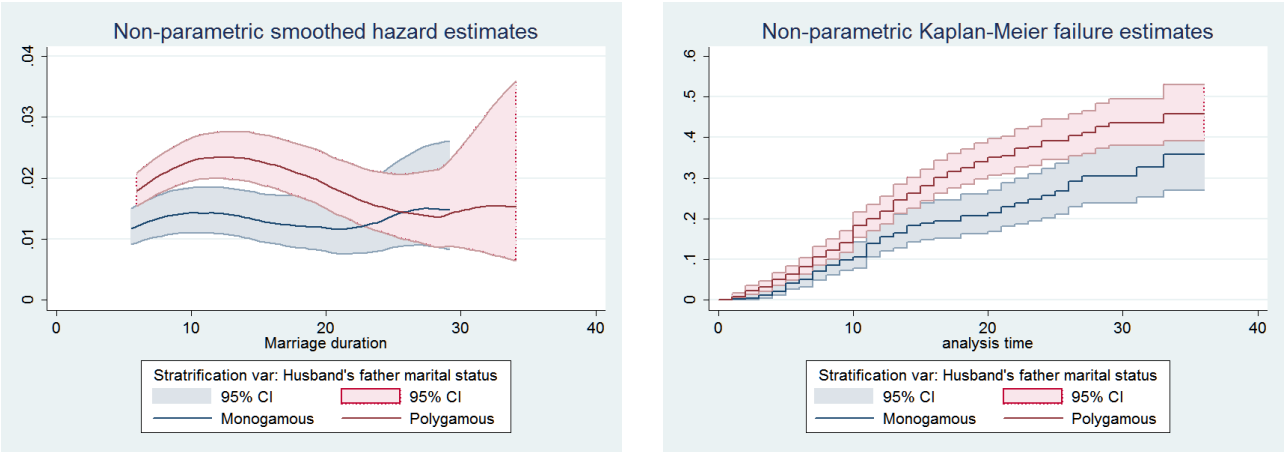

Table 7: Summary statistics (first stage sample made of monogamous unions and polygamous unions made of husband and first-rank wife)

Variables	N	Mean	Std. Dev.	Min	Max
Wife controls					
Age in years	1440	34.63403	11.34585	15	60
Age at marriage	1431	18.41929	4.34994	6	38
Serere ethnicity	1436	.1128134	.3164747	0	1
Pulaar ethnicity	1436	.3231198	.467831	0	1
Minority ethnicity	1436	.1573816	.3642871	0	1
Wolof ethnicity	1436	.4066852	.4913863	0	1
Fostered before 15	1436	.1504178	.357605	0	1
No education	1440	.7472222	.4347556	0	1
Secondary education or higher	1440	.0902778	.2866789	0	1
Primary education	1440	.1625	.369037	0	1
Works in non-agri. informal sector	1440	.2729167	.4456131	0	1
Works in non-agri. formal sector	1440	.0444444	.206152	0	1
Works in other/missing sector	1440	.1486111	.3558283	0	1
Works in agricultural sector	1440	.2479167	.4319532	0	1
Father: any formal edu.	1440	.1479167	.3551407	0	1
Father: Koranic education	1440	.40625	.4913029	0	1
Mother: any formal edu.	1440	.0673611	.2507334	0	1
Mother: Koranic education	1440	.1805556	.3847831	0	1
Father: non-agri. informal sect.	1440	.1993056	.399617	0	1
Father: non-agri. formal sect.	1440	.1444444	.3516619	0	1
Father: other activity	1440	.3118056	.4633918	0	1
Father: agricultural activity	1440	.3444444	.4753519	0	1
Wife is cell head	1440	.7243056	.4470188	0	1
Husband controls					
Age in years	1440	45.42708	13.29095	18	83
Age at marriage	1423	27.31413	5.771102	15	56
Serere ethnicity	1433	.1165387	.3209819	0	1
Pulaar ethnicity	1433	.3126308	.4637271	0	1
Minority ethnicity	1433	.1479414	.3551658	0	1
Wolof ethnicity	1433	.422889	.4941906	0	1
Fostered before 15	1430	.1678322	.3738479	0	1
No education	1440	.6756944	.4682774	0	1
Secondary education or higher	1440	.1645833	.3709329	0	1
Primary education	1440	.1597222	.3664755	0	1
Works in agricultural sector	1440	.2479167	.4319532	0	1
Works in non-agri. formal sector	1440	.1951389	.3964453	0	1
Works in other sector	1440	.1423611	.3495415	0	1
Owns the residence	1440	.4388889	.4964238	0	1
Father: any formal edu.	1440	.1215278	.3268531	0	1
Father: Koranic education	1440	.4375	.4962507	0	1
Mother: any formal edu.	1440	.0486111	.2151284	0	1
Mother: Koranic education	1440	.1986111	.3990932	0	1
Father: non-agri. informal sect.	1440	.1833333	.387074	0	1
Father: non-agri. formal sect.	1440	.1236111	.3292517	0	1
Father: other activity	1440	.3645833	.4814803	0	1
Father: agricultural activity	1440	.3284722	.4698207	0	1
Husband's father polygamous	1393	.6310122	.4827039	0	1
Husband is the household head	1440	0.70625	0.455637	0	1
Union controls					
Monogamous union	1440	.7743056	.4181841	0	1
Dakar region	1440	.3131944	.4639538	0	1
Other urban area	1440	.1708333	.376494	0	1
Rural area	1440	.5159722	.4999184	0	1
Household size	1440	11.02986	6.721074	2	44
Relative cell size	1440	.4850444	.2426905	0.0294118	0.9230769
% < 17 and > 60 yr-olds in hh	1440	51.47099	16.49042	0	87.5
Wife's father deceased	1428	.535014	.4989472	0	1
Husband's father deceased	1432	.7423184	.4375105	0	1

Data source: PSF Survey, wave 1 (2006-2007)

Table 8: Summary statistics (second stage panel sample made of monogamous unions in the two waves) and attrition

Variables	Number of observations	Mean on attrited sample (1)	Mean on panel sample (0)	Diff (1)-(0)	P-Value	
Number of observations	1115	333	782			
Wife controls						
Age in years	1115	32.9610	32.4949	0.466	0.5119	
Age at marriage	1108	18.9667	18.7095	0.257	0.3882	
Serere ethnicity	1112	0.1261	0.1091	0.017	0.4144	
Pulaar ethnicity	1112	0.3003	0.3504	-0.050	0.1049	
Minority ethnicity	1112	0.1502	0.1643	-0.014	0.5556	
Wolof ethnicity	1112	0.4234	0.3761	0.047	0.1389	
Fostered before 15	1111	0.1394	0.1639	-0.024	0.3050	
No education	1115	0.7117	0.7097	0.002	0.9465	
Secondary education or higher	1115	0.1171	0.0959	0.021	0.2851	
Primary education	1115	0.1712	0.1944	-0.023	0.3640	
Father: any formal edu.	1115	0.1562	0.1701	-0.014	0.5678	
Father: Koranic education	1115	0.3784	0.4066	-0.028	0.3779	
Mother: any formal edu.	1115	0.0751	0.0703	0.005	0.7791	
Mother: Koranic education	1115	0.1712	0.1841	-0.013	0.6064	
Father: non-agri. informal sect.	1115	0.2282	0.2136	0.015	0.5874	
Father: non-agri. formal sect.	1115	0.1471	0.1662	-0.019	0.4272	
Father: other activity	1115	0.3183	0.2839	0.034	0.2486	
Father: agricultural activity	1115	0.3063	0.3363	-0.030	0.3288	
Wife's relative cell size	1115	0.5230	0.4916	0.031	0.0552	*
Wife's father deceased	1104	0.4697	0.4845	-0.015	0.6527	
Wife is cell head	1115	0.6757	0.6509	0.025	0.4250	
Wife works in non-agri. informal sect.	1115	0.2462	0.2928	-0.047	0.1126	
Wife works in non-agri. formal sect.	1115	0.0450	0.0422	0.003	0.8305	
Wife works in other sect.	1115	0.1381	0.1458	-0.008	0.7393	
Wife works in agricultural sector	1115	0.1471	0.1586	-0.011	0.6301	
Husband controls						
Age in years	1115	43.7237	43.2110	0.513	0.5499	
Age at marriage	1101	27.8537	27.6675	0.186	0.6330	
Serere ethnicity	1109	0.1235	0.1145	0.009	0.6716	
Pulaar ethnicity	1109	0.2831	0.3449	-0.062	0.0445	**
Minority ethnicity	1109	0.1566	0.1480	0.009	0.7134	
Fostered before 15	1106	0.1424	0.1430	-0.001	0.9786	
No education	1115	0.6246	0.6419	-0.017	0.5825	
Secondary education or higher	1115	0.2162	0.1777	0.038	0.1336	
Father: any formal edu.	1115	0.1471	0.1292	0.018	0.4208	
Father: Koranic education	1115	0.4204	0.4246	-0.004	0.8984	
Mother: Koranic education	1115	0.1982	0.1944	0.004	0.8830	
Father: non-agri. informal sect.	1115	0.2042	0.1905	0.014	0.5982	
Father: non-agri. formal sect.	1115	0.1441	0.1458	-0.002	0.9435	
Father: no/other activity	1115	0.3544	0.3465	0.008	0.8025	
Wolof ethnicity	1109	0.4367	0.3925	0.044	0.1700	
Primary education	1115	0.1592	0.1803	-0.021	0.3944	
Mother: any formal edu.	1115	0.0751	0.0499	0.025	0.0979	*
Father: agricultural activity	1115	0.2973	0.3171	-0.020	0.5130	
Husband's father polygamous	1076	0.6258	0.5963	0.029	0.3672	
Husband's father deceased	1109	0.7173	0.7051	0.012	0.6833	
Husband is the household head	1115	0.6697	0.6419	0.028	0.3747	
Husband works in other activity	1115	0.1231	0.1560	-0.033	0.1551	
Husband works in agricultural sector	1115	0.2012	0.2494	-0.048	0.0827	
Husband works in non-agri. formal sect.	1115	0.2132	0.1905	0.023	0.3843	*
Husband owns the residence	1115	0.3423	0.3913	-0.049	0.1228	
Union controls						
Dakar region	1115	0.3814	0.3197	0.062	0.0463	**
Other urban area	1115	0.1772	0.1829	-0.006	0.8217	
Household size	1115	9.7447	11.0077	-1.263	0.0042	***
% < 17 and > 60 yr-olds in hh	1115	48.6877	51.9090	-3.221	0.0031	***

Data source: PSF Survey, wave 1 (2006-2007)

Table 9: Attrition between the two waves - Probit model

	Polygamy transitions		Other attrition		Other attrition excl. divorces	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Estimated risk of polygamy, $\widehat{F}_t$	0.137***		−0.092		−0.060	
	(0.050)		(0.079)		(0.069)	
Wife controls						
Age at marriage		−0.000		−0.001		−0.001
		(0.002)		(0.003)		(0.003)
Serere ethnicity		−0.056		0.046		0.002
		(0.052)		(0.058)		(0.057)
Pulaar ethnicity		−0.039		0.040		0.012
		(0.040)		(0.045)		(0.042)
Minority ethnicity		−0.047		−0.029		−0.020
		(0.036)		(0.047)		(0.050)
Fostered before 15		−0.053*		−0.018		−0.015
		(0.028)		(0.031)		(0.029)
No formal education		0.006		0.045		0.034
		(0.029)		(0.036)		(0.035)
Secondary education or higher		0.031		0.038		0.008
		(0.033)		(0.050)		(0.046)
Mother: Koranic education		0.014		−0.036		−0.044
		(0.020)		(0.036)		(0.033)
Father: any formal education		0.011		−0.056+		−0.085***
		(0.023)		(0.035)		(0.033)
Father: Koranic education		−0.014		−0.034		−0.023
		(0.023)		(0.033)		(0.032)
Husband controls						
Age at marriage		−0.001		0.001		0.002
		(0.001)		(0.002)		(0.002)
Serere ethnicity		0.006		0.013		0.038
		(0.055)		(0.056)		(0.055)
Pulaar ethnicity		−0.048		−0.010		0.037
		(0.043)		(0.045)		(0.043)
Minority ethnicity		−0.027		0.091*		0.085*
		(0.038)		(0.047)		(0.049)
Fostered before 15		−0.000		−0.033		−0.032
		(0.025)		(0.035)		(0.033)
No formal education		0.033		−0.001		0.007
		(0.027)		(0.033)		(0.031)
Secondary education or higher		0.009		0.062		0.060
		(0.034)		(0.043)		(0.041)
Mother: Koranic education		0.028		−0.022		−0.025
		(0.019)		(0.035)		(0.033)
Father: any formal education		−0.009		0.016		0.034
		(0.034)		(0.038)		(0.036)
Father: Koranic education		0.009		0.007		0.003
		(0.020)		(0.032)		(0.032)
Union controls						
Dakar region		−0.065***		0.143***		0.139***
		(0.024)		(0.037)		(0.034)
Other urban area		−0.026		0.076*		0.072+
		(0.026)		(0.046)		(0.044)
Additional controls†	No	Yes	No	Yes	No	Yes
Number of observations	1076	1115	1076	1115	1076	1115
Number of attrited obs.	102	102	194	194	169	169

Probit model; Standard errors in parentheses are bootstrapped (300 replicates) in columns (a), and clustered at the district level in columns (b); $^{+}$ $p < 0.12$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The estimation sample includes all monogamous unions in which the wife is aged 15 to 60 in the first wave of the PSF Survey.

The dependent variable in columns (1) is a dummy variable equal to 1 for unions that became polygamous between the two survey waves; in columns (2) a dummy equal to 1 for unions with other marital transitions than polygamy (widowhood, divorce) or that were not surveyed in the second wave (i.e. not found, had migrated abroad or deceased); in columns (3) a dummy equal to 1 for unions with other marital transitions than polygamy and divorce or that were not surveyed in the second wave (i.e. not found, had migrated abroad or deceased)

$\widehat{F_t}$: predicted failure probability estimated by a stratified Cox survival model (see Table 1).

† Additional controls include dummies for sectors of activity of both spouses' fathers.

Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 10: First-step estimation results for the risk of polygamy

Hazard ratio estimates from different duration models for transitions to polygamy				
	(1)	(2)	(3)	(4)
Wife controls				
Age at marriage	0.977	0.981	0.982	0.978
	(0.018)	(0.019)	(0.018)	(0.018)
Serere ethnicity	0.630	0.594	0.615	0.624
	(0.257)	(0.251)	(0.256)	(0.254)
Pulaar ethnicity	1.036	1.081	1.061	1.031
	(0.385)	(0.409)	(0.400)	(0.393)
Minority ethnicity	1.062	1.046	1.030	1.062
Ref: Wolof ethnicity	(0.334)	(0.326)	(0.320)	(0.396)
Fostered before 15	0.668**	0.651**	0.668**	0.660**
	(0.124)	(0.120)	(0.124)	(0.121)
No formal education	1.709**	1.705**	1.709**	1.687**
	(0.416)	(0.419)	(0.418)	(0.423)
Secondary education or higher	1.350	1.493	1.439	1.342
Ref: Primary education	(0.487)	(0.529)	(0.511)	(0.480)
Dowry		0.990		
		(0.031)		
Father in a polygamous union		1.334**	1.336**	
		(0.169)	(0.169)	
Husband controls				
Age at marriage	0.969***	0.967***	0.968***	0.969***
	(0.011)	(0.011)	(0.011)	(0.011)
Serere ethnicity	0.974	1.015	1.014	0.973
	(0.393)	(0.420)	(0.417)	(0.390)
Pulaar ethnicity	0.636	0.637	0.657	0.640
	(0.238)	(0.242)	(0.249)	(0.247)
Minority ethnicity	0.733	0.792	0.808	0.732
Ref: Wolof ethnicity	(0.235)	(0.253)	(0.258)	(0.279)
Fostered before 15	1.581***	1.627***	1.619***	1.588***
	(0.205)	(0.209)	(0.208)	(0.215)
No formal education	1.298	1.269	1.253	1.303
	(0.257)	(0.250)	(0.246)	(0.258)
Secondary education or higher	1.005	1.001	0.994	1.002
Ref: Primary education	(0.294)	(0.292)	(0.288)	(0.292)
Bride price		0.930+		
		(0.043)		
Father in a polygamous union			1.425***	1.503***
			(0.188)	(0.195)
Union controls				
Dakar region	0.833	0.789	0.797	0.823
	(0.147)	(0.141)	(0.142)	(0.139)
Other urban area	0.729*	0.707*	0.712*	0.720*
Ref: rural area	(0.135)	(0.131)	(0.133)	(0.136)
Additional controls 1†	Yes	Yes	Yes	Yes
Number of observations	1356	1330	1330	1356

Columns (1) to (3): Semi-parametric Cox proportional hazard model ; Columns (1) and (2): the model is stratified stratified by the polygamy status of the husband's father; Column (4), flexible parametric Royston-Parmar model

Column (1) represents the main specification used in this article.

Exponentiated coefficients are presented (hazard ratios), Robust standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The estimation sample includes all monogamous unions and polygamous unions made of husband and first-rank wife aged 15 to 60, in the first wave of the PSF Survey.

† Additional controls include dummies for Koranic education of both spouses' parents, and for formal education and sectors of activity of both spouses' fathers.

Data source: PSF Survey, wave 1 (2006-2007)

Table 11: Impact of the risk of polygamy (estimated by an alternative stratified Cox model) on wives' savings
Panel fixed effect estimation

	(a) Savings stock (in log)			(b) Has savings (dummy)			(c) Share in
	Total	Institutions	At home	Total	Institutions	At home	institutions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: equation (3), incl. time, t and t^2, union FE†							
Estimated risk of polygamy, $\widehat{F}_t$	7.590	10.213^{+}	1.998	0.985^{+}	1.253**	0.398	0.267
	(6.473)	(6.262)	(3.296)	(0.633)	(0.607)	(0.377)	(0.220)
Number of observations	1516	1516	1516	1516	1516	1516	1490
Number of unions	758	758	758	758	758	758	745
Within R2	0.0084	0.0083	0.026	0.014	0.012	0.031	0.84
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡							
Estimated risk of polygamy, $\widehat{F}_t$	9.623	13.097**	0.667	0.977	1.328**	0.279	0.361
	(6.580)	(6.387)	(3.350)	(0.657)	(0.636)	(0.383)	(0.253)
Number of observations	1456	1456	1456	1456	1456	1456	1436
Number of unions	728	728	728	728	728	728	718
Within R2	0.019	0.022	0.051	0.024	0.025	0.056	0.84
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t, and t^2, union FE*							
Estimated risk of polygamy, $\widehat{F}_t$	13.375	13.969^{+}	-1.848	1.417^{+}	1.462*	-0.025	0.293
	(9.043)	(8.963)	(4.390)	(0.901)	(0.887)	(0.474)	(0.334)
Number of observations	1456	1456	1456	1456	1456	1456	1436
Number of unions	728	728	728	728	728	728	718
Within R2	0.075	0.068	0.093	0.082	0.076	0.098	0.84
Unconditional mean (wave 1)	3.94	3.76	0.47	0.38	0.36	0.05	0.35

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p< 0.12, * p<0.10, ** p<0.05,*** p<0.01.
Dependent variables: col (a): stock of savings of the wife (in log); col. (b): a dummy equal to one if wife has savings, col. (2) and (5) correspond to savings entrusted to informal or formal institutions, col. (3) and (6) to savings kept at home. In col. (7): Share of the total stock of savings entrusted to informal or formal institutions
Sample: monogamous unions in the two waves.
$\widehat{F_t}$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (specification shown in Table 10, column (2)).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 10) interacted with time
In col. 7: we additionally control for the total level of savings in log
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 12: Impact of the risk of polygamy (estimated by a standard Cox model) on wives' savings
Panel fixed effect estimation

	(a) **Savings stock (in log)**			(b) **Has savings (dummy)**			(c) **Share in**
	Total	Institutions	At home	Total	Institutions	At home	institutions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: equation (3), incl. time, t and t^2, union FE†							
Estimated risk of polygamy, $\widehat{F}_t$	10.981*	12.597**	1.760	1.377**	1.532**	0.393	0.310
	(6.520)	(6.343)	(3.576)	(0.656)	(0.636)	(0.402)	(0.246)
Number of observations	1560	1560	1560	1560	1560	1560	1534
Number of unions	780	780	780	780	780	780	767
Within R2	0.010	0.010	0.028	0.016	0.015	0.033	0.84
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡							
Estimated risk of polygamy, $\widehat{F}_t$	13.114*	15.641**	0.557	1.390**	1.637**	0.291	0.403*
	(7.021)	(6.873)	(3.667)	(0.695)	(0.675)	(0.416)	(0.227)
Number of observations	1494	1494	1494	1494	1494	1494	1474
Number of unions	747	747	747	747	747	747	737
Within R2	0.021	0.023	0.052	0.026	0.026	0.057	0.84
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t, and t^2, union FE*							
Estimated risk of polygamy, $\widehat{F}_t$	12.365	12.969	-2.455	1.451+	1.493*	-0.080	0.355
	(8.933)	(8.643)	(4.686)	(0.889)	(0.857)	(0.510)	(0.325)
Number of observations	1494	1494	1494	1494	1494	1494	1474
Number of unions	747	747	747	747	747	747	737
Within R2	0.064	0.060	0.091	0.072	0.069	0.097	0.84
Unconditional mean (wave 1)	3.94	3.76	0.47	0.38	0.36	0.05	0.35

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); * p<0.10, ** p<0.05,*** p<0.01.
Dependent variables: col (a): stock of savings of the wife (in log); col. (b): a dummy equal to one if wife has savings, col. (2) and (5) correspond to savings entrusted to informal or formal institutions, while col (3) and (6) to savings kept at home. In col. (7): Share of the total stock of savings entrusted to informal or formal institutions
Sample: monogamous unions in the two waves.
$\widehat{F}_t$: predicted failure probability estimated by a Cox survival model (specification in Table 10, column (3)).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
In col. 7: we additionally control for the total level of savings in log
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 13: Impact of the risk of polygamy (estimated by a Royston-Parmar model) on wives' savings
Panel fixed effect estimation

	(a) Savings stock (in log)			(b) Has savings (dummy)			(c)
	Total	Institutions	At home	Total	Institutions	At home	**Share in** institutions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: equation (3), incl. time, t and t^2, union FE†							
Estimated risk of polygamy, $\widehat{F}_t$	10.537^{+}	11.727*	2.534	1.303*	1.419**	0.480	0.213
	(6.725)	(6.611)	(3.683)	(0.680)	(0.665)	(0.410)	(0.261)
Number of observations	1560	1560	1560	1560	1560	1560	1534
Number of unions	780	780	780	780	780	780	767
Within R2	0.010	0.0093	0.029	0.016	0.013	0.034	0.84
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡							
Estimated risk of polygamy, $\widehat{F}_t$	12.539*	14.766**	1.195	1.300*	1.521**	0.367	0.315
	(7.212)	(7.161)	(3.862)	(0.709)	(0.699)	(0.436)	(0.239)
Number of observations	1494	1494	1494	1494	1494	1494	1474
Number of unions	747	747	747	747	747	747	737
Within R2	0.020	0.022	0.052	0.025	0.024	0.058	0.84
Panel C: equation (5), incl. 1st-step controls $\times$ time $X_1 \times t$, X_t, t, and t^2, union FE*							
Estimated risk of polygamy, $\widehat{F}_t$	12.834	12.798	-1.700	1.485^{+}	1.466^{+}	0.013	0.242
	(9.431)	(9.133)	(5.216)	(0.935)	(0.903)	(0.561)	(0.354)
Number of observations	1494	1494	1494	1494	1494	1494	1474
Number of unions	747	747	747	747	747	747	737
Within R2	0.064	0.060	0.091	0.072	0.068	0.096	0.84
Unconditional mean (wave 1)	3.94	3.76	0.47	0.38	0.36	0.05	0.35

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); * p<0.10, ** p<0.05,*** p<0.01.
Dependent variables: col (a): stock of savings of the wife (in log); col. (b): a dummy equal to one if wife has savings, col. (2) and (5) correspond to savings entrusted to informal or formal institutions, col. (3) and (6) to savings kept at home. In col. (7): Share of the total stock of savings entrusted to informal or formal institutions
Sample: monogamous unions in the two waves.
$\widehat{F}_t$: predicted failure probability estimated by a flexible parametric survival model (Royston and Parmar, 2002) (specification in Table 10, column (4)).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
In col. 7: we additionally control for the total level of savings in log
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 14: The risk of polygamy and spouses' labor supply and income
Panel fixed effect estimation

	(a) **Wife**			(b) **Husband**		
	Number of weeks worked	Total income (in log)	Any earned income (dummy)	Number of weeks worked	Total income (in log)	Any earned income (dummy)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: equation (3), incl. time, t and t^2, union FE†						
Estimated risk of polygamy, $\widehat{F}_t$	-22.454	-4.020	-0.989	43.040*	6.897**	0.573
	(24.815)	(3.374)	(0.683)	(22.387)	(3.112)	(0.565)
Number of observations	1458	1406	1548	1336	1324	1548
Number of unions	729	703	774	668	662	774
Within R2	0.0029	0.011	0.014	0.017	0.013	0.012
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡						
Estimated risk of polygamy, $\widehat{F}_t$	-8.073	-1.692	-0.625	48.856**	8.624***	1.176**
	(25.083)	(3.585)	(0.682)	(23.243)	(3.260)	(0.589)
Number of observations	1394	1346	1482	1322	1306	1482
Number of unions	697	673	741	661	653	741
Within R2	0.027	0.041	0.029	0.022	0.024	0.025
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t, and t^2, union FE*						
Estimated risk of polygamy, $\widehat{F}_t$	-9.267	-2.744	-1.405^{+}	72.711**	5.779	0.431
	(31.537)	(4.612)	(0.893)	(31.209)	(4.355)	(0.794)
Number of observations	1394	1346	1482	1322	1306	1482
Number of unions	697	673	741	661	653	741
Within R2	0.13	0.10	0.092	0.058	0.080	0.053
Unconditional mean (wave 1)	14.9	2.05	0.38	30.2	5.50	0.85

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p<0.12,* p<0.10, ** p<0.05,*** p<0.01.
Columns (a) for wives and columns (b) for husbands. Dependent variables: in column (1) and (4), the number of weeks worked over the last 12 months ; col. (2) and (5): total earnings over the last 12 months (in log), col. (3) and (6): a dummy equal to one if any earned income over the last 12 months.
$\widehat{F_t}$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
$\widehat{F_t}$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)

Table 15: The risk of polygamy and husbands' savings
Panel fixed effect estimation

	(a) **Savings stock (in log)**			(b) **Has savings (dummy)**			(c) **Share in**
	Total	Institutions	At home	Total	Institutions	At home	institutions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: equation (3), incl. time, t and t^2, union FE†							
Estimated risk of polygamy, $\widehat{F}_t$	11.487*	5.245	7.600^{+}	1.121*	0.368	0.842*	0.077
	(6.575)	(5.499)	(4.821)	(0.643)	(0.540)	(0.488)	(0.341)
Number of observations	1370	1374	1410	1414	1414	1414	1370
Number of unions	685	687	705	707	707	707	685
Within R2	0.042	0.020	0.034	0.054	0.026	0.042	0.50
Panel B: equation (4), incl. time-varying controls X_t, t and t^2, union FE‡							
Estimated risk of polygamy, $\widehat{F}_t$	10.966^{+}	5.198	6.220	1.122*	0.398	0.735	0.142
	(6.776)	(6.010)	(4.993)	(0.624)	(0.529)	(0.508)	(0.361)
Number of observations	1352	1356	1392	1396	1396	1396	1352
Number of unions	676	678	696	698	698	698	676
Within R2	0.052	0.028	0.043	0.061	0.034	0.051	0.50
Panel C: equation (5), incl. 1st-step controls × time $X_1 \times t$, X_t, t, and t^2, union FE*							
Estimated risk of polygamy, $\widehat{F}_t$	-4.808	1.401	-8.260	-0.301	0.296	-0.756	0.420
	(8.227)	(6.256)	(5.898)	(0.685)	(0.537)	(0.584)	(0.394)
Number of observations	1352	1356	1392	1396	1396	1396	1352
Number of unions	676	678	696	698	698	698	676
Within R2	0.10	0.063	0.12	0.10	0.066	0.13	0.53
Unconditional mean (wave 1)	2.76	1.87	1.13	0.27	0.18	0.11	0.15

Panel union fixed effect model estimates. Standard errors in parentheses are bootstrapped (300 replications); $^{+}$ p<0.12,* p<0.10, ** p<0.05,*** p<0.01.
Dependent variables: col (a): stock of savings of the husband (in log); col. (b): a dummy equal to one if husband has savings, col. (2) and (5) correspond to savings entrusted to informal or formal institutions, col. (3) and (6) to savings kept at home. In col. (7): Share of the total stock of savings entrusted to informal or formal institutions
Sample: monogamous unions in the two waves.
$\widehat{F}_t$: predicted failure probability estimated by a Cox survival model stratified by the polygamy status of the husband's father (see Table 1).
All regressions include union fixed-effects
† Controls not shown: time (in months) between the two survey waves and its square
‡ Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents
* Controls not shown: time, time squared, dummies for the deceased father of each spouse, household size, relative cell size, share of dependents, all step-1 controls (see Table 1) interacted with time
In col. 7: we additionally control for the total level of savings in log
Data source: PSF Survey, waves 1 and 2 (2006-2007 and 2010-2012)