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Marriage payments and wives' welfare: All you need is love ☆

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ABSTRACT

Bride price is essential to marriage in West Africa, and its impact on wives' well-being in their marital life is a matter of debate. According to our data from Senegal, transfers to the bride's family characterize approximately 85% of marriages. Furthermore, although this is largely ignored in the literature, these marriages are also characterized by the simultaneous existence of other marriage payments, which flow in different directions between the stakeholders. This paper studies the relationship between these multiple marriage payments and the well-being of the wife in her household. We use a unique survey that asks separate questions about the different types of marriage payments. We highlight the strength of the link between what is given to the bride herself and her welfare, as opposed to the looseness of the relation between this welfare and what is given to her family.

1. Introduction

In Senegal, marriage is almost universal for women, and the social pressure to be married is extremely high. Marriage and motherhood are important components of women's social status and an essential part of their lives. Therefore, women's welfare within marriage is a crucial aspect of their well-being. Marriage payments are pervasive in this country, the most important being the bride price, a payment from the family of the groom to the family of the bride. According to our data, 85% of marriages that occurred between 1996 and 2006 involved a bride price.

In this paper, we set out to elucidate the relationship between marriage payments and married women's welfare in Senegal. In this context, several payments take place at the time of marriage, flowing in different directions between stakeholders. Our contribution is twofold. First, thanks to the unique data we collected, we make original contributions in two directions. On the one hand, we distinguish between marriage payments flowing between the partner's families and those that take place between the spouses, and show how they differ in the way their amounts are set and how they relate to the wife's post-marital welfare. On the other hand, we explore a range of rarely available welfare outcomes thanks to our ability to observe intra-household allocation of resources and financial support from husband to wife. Second, we propose an original conceptual framework to explore the mechanisms at play.

Bride prices exist in many countries; for example, they are the main form of marriage payments in rural China, Thailand, sub-Saharan African and Middle-Eastern countries (Anderson, 2007). However, behind this common designation there are major contextual variations in this practice.[1] Bride prices have been studied in the social sciences, in particular their ceremonial function and mostly by the anthropological literature (Drucker, 1965; Kressel, 1977; Goody, 1973). The practice characterizes marriage markets where the search for a spouse is generally conducted on the groom's side, with the groom and his kin striving to find the most desirable match. In marriage markets where dowries (payments from the family of the bride to the family of the groom) prevail, the search is typically conducted on the bride's side. The literature has devised models to explain the existence of such payments. The bride price is seen as a compensation for the bride's

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[1] The word bridewealth is sometimes used because it does not carry as much stigma as wife purchasing within a transaction. Nevertheless, the transfer between the groom's kin and the bride's kin is not necessarily a transfer of wealth, as it does not inevitably consist of assets that could generate a future income flow. Instead, it might instead be consumption goods purchased with the product of labor (see, for example, Bell (2008) for a discussion of this distinction). In this paper, we will use the term bride price.

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parents for the loss of their daughter who represents an asset, or as a compensation for the bride herself (Becker, 1991). The role of women in labor-intensive agricultural societies is often put forward to explain the prevalence of bride prices over dowries in those societies, where the bride price amounts to a payment for the transfer of the woman's labor and the rights to her fertility from her parents' lineage to that of her husband (Bell, 2008; Boserup et al., 2013; Falen, 2011).

There are a number of reasons why bride prices could affect the well-being of women in their marriage and the debate is ongoing as to whether this tradition is detrimental to women. In 2004, the International Conference on Bride Price, organized by MIFUMI, a women's rights NGO based in Kampala, Uganda, took a clear stand against the practice. This conference concluded by forming a resolution stating that the bride price practice should be banned, as it is akin to the purchase of women who therefore lose all agency in regard to their fertility and sexuality (Wendo, 2004). The idea that bride prices disenfranchise women is echoed in the economic literature, in particular that on Uganda, by papers stressing the negative impact of bride prices on women's independence and their household decision-making role (Kaye et al., 2005). Gaspart and Platteau (2010) emphasize another channel for a potential negative impact of the bride price on wives' welfare. In the context of their study (i.e., the River Valley in Senegal), the bride price might have to be returned if the woman leaves the relationship early in the marriage. The strategic model these authors develop implies that a high bride price increases the groom's incentive to encourage his wife to ask for a divorce, potentially using violence to this end. The fact that the bride price may eventually be returned can also be seen in the Ugandan context, where, according to the work of Bishai and Grossbard (2010), the practice limits the wife's incentive to have extramarital affairs. Finally, in the recent economic literature, Corno and Voena (2016) and Corno et al. (2020) use data from several countries in Africa to show that the probability of having an early marriage is higher in the event of negative shocks to family income among societies that practice bride prices. Early marriage could be a way for families to smooth their consumption, thanks in part to the receipt of the bride price.

A contrary assessment of the practice suggests that, since the bride price is paid when the wife has a positive value, it could reflect her bargaining power in her household and thus positively influence her access to household resources and her children's outcomes.[2] When perceived as favorable, a bride price might at times be used as a proxy for bargaining power, either because it is viewed as a substantial endowment for the woman that can then contribute to her empowerment, or because it reflects the woman's positive value for the husband (Becker, 1991; Doss, 2013). In line with this view, Mbaye and Wagner (2017) find that a higher bride price reduces fertility pressure in rural areas of Senegal. In a different setting, Mansoor (2018) also finds that a higher bride price increases the probability of modern contraceptive use, which is interpreted as a sign of higher bargaining power for women. In addition, Ashraf et al. (2020) show that in Indonesia and Zambia, the construction of schools has increased the education of girls belonging to ethnic groups that practice high bride prices. Parents' strategic decisions regarding their daughters' marriage, aimed at affecting the timing or amount of the bride price, can therefore have positive as well as negative impacts.

Finally, Chan and Zhang (1999) suggest that the bride price should have no impact on the intrahousehold allocation of resources, since it goes to the parents of the bride. They contrast this with what happens with a dowry, which may, at least in part, be retained by the wife. The idea that the bride price might not affect the welfare of women in marriage is consistent with the fact that bride-price amounts are described as bearing little relation to the wife's characteristics, as they are often quite uniform throughout society (Anderson, 2007; Goody, 1973). In the context of the DRC, Lowes and Nunn (2017) find no systematic link between the amounts of bride prices and earlier marriage or higher fertility.

In Senegal, while the bride price is the most systematic marriage payment, other transfers between parties are also commonly observed. Two important components of these transfers concern the bride herself. She receives a transfer from her husband, which here we will refer to as *le cadeau* (i.e., the gift), as it is called in French, and she brings to the household a certain amount of resources, akin to a wedding trousseau (*le bagage*). Although ignoring these other payments when assessing the correlates of married women's well-being is likely to be misleading, marriage payments have rarely been analyzed in their full complexity, at least by economists. Indeed, despite a significant literature on dowries and bride prices, the fact that marriages often give rise to several simultaneous payments (this is, for example, also true in Pakistan or Bangladesh, as presented by Ambrus et al. (2010)) is hardly ever taken into account.

One possible view is that only the total amount of all marriage payments is relevant. Indeed, since post marriage transfers between spouses or between the bride and her family may reallocate the total amount, the various payments could potentially be fully fungible. Nevertheless, the persistent coexistence of different marriage payments raises the possibility that each one plays a specific role and relate differently to the wife's welfare. In this case, they should be considered separately. We test for fungibility and conclude against this hypothesis. We therefore address the question of the links between marriage payments and the wife's well-being, by looking at each of these payments and assessing their relation with different measures of well-being. The well-being outcomes we consider range from individual consumption to fertility pressure. This undertaking was made possible by the use of original data from the "Pauvreté et Structure Familiale" (PSF) survey, which were collected in Senegal in 2006 (De Vreyer et al., 2008). The PSF data are particularly well suited to our objective because they provide detailed information on transfers at the time of marriage for every unbroken marriage; the bride price, the *cadeau* and the *bagage* are precisely recorded. They also provide information on consumption at the disaggregated intra-household level, allowing us to distinguish between the consumption accruing to the wife and that of her husband. Finally, the data also records the husband's financial support to his wife.

To the best of our knowledge, our work is one of the first to detail the different transfers occur that at the time of marriage and to show that these payments relate to the wife's welfare in distinct ways. Nevertheless, we cannot claim to have found causal links, as we have no sources of exogenous variations for the amounts paid.[3] We develop a conceptual framework in line with anthropological knowledge and the qualitative evidence we gathered. The way the matches are determined on the marriage market is outside the scope of this conceptual framework: we only assume that matches result from family decisions and that the personal inclination of the future spouses does not impact this choice. We concentrate on articulating a model of the determinants of marriage payments (once the match is decided upon) to the wife's welfare outcomes. This model posits that the bride price is a market price, while the *cadeau* is used by the groom to signal his love for the bride, thereby revealing private information that was not taken into account when the match was decided upon. Signaling love

[2] For studies on the impact of mother's bargaining power on children outcomes, see Doss (1996), Duflo (2003) and Lépine and Strobl (2013).

[3] Some authors have been able to use exogenous income shocks induced by weather variability (Corno et al., 2020). In Senegal, we find that the lack of rain during the agricultural season tends to lead to the postponement of weddings, but does not affect the amount paid (see Section 5 and Table A.13). As regards dowries, Bhalotra et al. (2020) use changes in the world price of gold as a source of exogenous variation. Such a strategy is not applicable in the Senegalese case as it is difficult to think of a relevant good whose price on the world market would affect marriage payments.

allows the groom to improve the quality of the marriage by generating cooperation between spouses. This model serves as a guide to interpret the empirical findings. Empirically, the results show that the bride price does not seem to correlate with either the wife's access to household resources or other measures of well-being that we use, unlike the *cadeau* received from the husband. The results point to unobservable characteristics that explain both the existence and the amount of the *cadeau* and the relative consumption of the wife in the household (and more generally, the wife's well-being) but are uncorrelated with the bride price itself. The model suggests that these unobservable variables should be interpreted as the importance that the husband attaches to his wife (or his love for her), which he signals through the value of the *cadeau*.

Section 2 of the paper presents the context and Section 3 outlines the conceptual framework. Section 4 describes the data. Section 5 highlights the determinants of diverse marriage payments. Section 6 analyzes how those payments relate to womens' well-being and offers an interpretation of these results. Section 7 checks the robustness of the results to the sample choice. Finally, Section 8 concludes the paper.

2. Marriage payments in Senegal

Bride prices are present in most marriages in Senegal. They are either in-kind or cash transfers given by the family of the groom or the groom himself to the family of the bride. The bride price is given before the marriage. Although the marriage might have been arranged very early on, the payment of the bride price is the trigger that allows the wife to join her husband's household and actually start their marital life. The amount of the bride price is negotiated between the two sets of parents and is largely determined on the basis of local norms.

As is often the case in Muslim societies (Goody, 1973), a large proportion of the bride price is spent on the wedding ceremony, in particular meals and clothing. The size of the wedding ceremony matters to families as, according to qualitative interviews, it is a way for the family of the bride to establish or consolidate their social status. The wedding ceremony is an occasion for many gifts to be exchanged among all the guests. Thus, the portion of the bride price that is not spent on ceremonial expenses is redistributed by the bride's mother to people who are deemed to be deserving of this gift because they played a role in the childhood of the bride or because they contributed to the ceremony. None of the bride price is retained for future consumption. The guests (even those who did not receive money from the bride's mother) also make small monetary contributions (called *ndawtal*). The counterparty to this contribution will take place when the donors organize a ceremony themselves at a later date. The wedding is therefore an essential occasion to strengthen the family's social network, which could be remobilized later, in particular for the future marriages of siblings. Buggenhagen (2012) offers a precise description of this gift/counter-gift dynamic and its role in maintaining an active social network.

Therefore, even though a bride's family receives a bride price, in Senegal, this does not imply a real windfall on the occasion of their daughters' wedding. Since it is a way to invest in social status and social networks, it may have a long-term effect, but the direct income shock caused by bride prices is probably very limited. In some rare cases, a small portion of the bride price could be given to the bride, but it is often spent on her ceremonial outfit. If the bride price has an effect on the parental network, this effect might trickle down to the bride at some point in a context where family is a natural insurance network and transfers between generations are extremely common (La Ferrara, 2010; Fafchamps and Quisumbing, 2007). Hence, the bride price may still affect the well-being of the wife, but to a lesser extent than that of her parents. This is consistent with the argument made by Chan and Zhang (1999).

The *cadeau* is specifically given by the husband to the bride. Traditionally, jewelry is offered, constituting a precautionary saving that is kept by the wife and can be used in case of divorce or widowhood. This offering therefore plays a similar role to the dower found in other Muslim countries. Qualitative interviews suggest that nowadays, the *cadeau* is more likely to consist of conspicuous consumption goods, such as smartphones or radios, as well as money, at least in urban settings. It might thus have lost its long-term protective role. The *cadeau* is not mandatory when people get married, unlike the bride price. In fact, this practice was present in less than two-thirds of the marriages we observed.

Given that the *cadeau* is optional, controlling for the husband's wealth, this practice may represent a fairly accurate signal of the value the husband attaches to marrying this particular woman, and this is clearly how many women interpret it. Moreover, the *cadeau* is also often one of the first occasions when the husband has the ability to show his commitment or involvement, and the practice allows him to demonstrate that he values the individualized relationship. There is another interpretation of the *cadeau* which is consistent with this view: it may result from pre-marital negotiation and aim to shift endowments in favor of the wife. In fact, dowers in general play a this role by strengthening the wife's outside option. Nevertheless, in its current form in Senegal, with a strong shift away from durable goods towards conspicuous consumption, such a role is not as likely.

The monetary component of the *cadeau* can be used to partly cover the cost of the *bagage*, which is the trousseau the wife brings to her new household. The wife's family also contributes to the *bagage*. There is a high level of individual variation in the share of the *bagage* covered by the bride's own relatives and that covered by the husband's contribution. This *bagage* takes the form of kitchen utensils, dishes and other housewares, and sometimes bedroom furnishing. It is essential to ensure the wife's well-being in her new household; borrowing kitchen utensils from other women in the house is frowned upon. The content of the *bagage* remains the property of the bride alone. Because it often comes in large part from the bride's own family, its presence and size may well reflect the strength of the support she can expect from her kin group. In this sense, the *bagage* might correlate with a woman's outside options and affect her bargaining power within her marriage.

As well as the bride price, the *cadeau* and the *bagage*, an in-kind transfer is sometimes made from the family of the bride to the family of the groom, mainly in the form of clothing for the wedding ceremony.[4]

In the event of divorce, in principle, both the *cadeau* and the *bagage* remain the property of the bride. The bride price is supposed to be returned if the divorce is initiated by the woman and if it occurs very early after the wedding. In practice, throughout the qualitative interviews with divorced women that we conducted in Senegal, we never met anyone who had to reimburse the bride price; however, we did observe that when women initiate a divorce, this often involves them leaving their home with hardly anything and leaving most of the *bagage* behind.[5]

The Senegalese data used in this paper reveal that in the sample of 689 women whose first marriage occurred in the 10 years preceding the survey (between 1996 and 2006), a bride price was given in 85% of cases, a *cadeau* was received in 62% of cases, and the wife brought a *bagage* to the marriage in 56% of cases (Table 1). The transfer amounts are also quite large. Despite the fact that bride price amounts are in principle regulated by the February 1967 law on ceremonial expenses and limited to 3000 CFA francs, we observe a mean bride price at the time of a first marriage, including the 15% of marriages where no bride price was paid, of about 121,000 (constant 2005) CFA francs ($211).[6] The mean *cadeau* reaches 68,000 (2005) CFA francs ($118), while the

[4] In our sample this concerns only 15% of marriages.

[5] See transcribed interviews in French in Lambert and van de Walle (2012).

[6] The legal amount, which is well below the observed levels, has not been adjusted since the enactment of the law. http://www.dri.gouv.sn/sites/default/files/LOI/1967/67 04.pdf.

Table 1
Frequency of marriage payments.
Source: PSF 2006.

	N	Mean	SD
Positive bride-price	689	0.85	0.36
Positive *Cadeau*	689	0.62	0.49
Positive *Bagage*	689	0.56	0.50

Note: Sample: Women married between 1996 to 2006, observed in their first marriage.

value of the *bagage* is on average 52,000 (2005) CFA francs ($89) (Table 2). In one-third of all marriages, the three types of transfers exist simultaneously, and bride price and *Cadeau* co-exist in another 15.5% of marriages (Table A.1 in the Appendix). The sum of the bride price and the *cadeau* represents about 58% of the mean annual consumption per capita in the country. For first marriages, when these payments are strictly positive they amount respectively to 43% and 33% of annual per capita consumption.[7] As can be seen in Table 3, the coefficients of correlation between bride-price and *cadeau* is close to zero and not significantly different from zero, at 0.06. It is higher, at 0.21 and 0.22 for the correlation between the *bagage* and, respectively, the *cadeau* and the bride-price.[8] Bride prices are much less frequent when women remarry (61% of cases), while the occurrence of a *cadeau* is only slightly less frequent (53%). For these two payments, amounts are on average almost twice as low in these cases. See Table A.3 in the Appendix.

The simultaneous presence of these different transfers at the time of marriage has never been studied. Some previous works have sought to understand simultaneous dowries and bride prices (e.g., in Bangladesh and Taiwan) but mainly in the context of the slow transition from one system to the other. In Senegal, the nature of those transfers seems to differ deeply; thus, understanding their respective drivers and how they relate to married women's welfare would shed light on this understudied aspect of the marital institution in this context.

3. Conceptual framework

3.1. Are bride price and Cadeau fungible payments?

One of the objectives of the paper is to propose a conceptual framework that conforms to the anthropological description of marriage payments in Senegal. Nevertheless, before launching into this, it is worth checking whether the narrative around these payments reflects a persistent reality rather than past traditional practices. Indeed, the persistent coexistence of bride price and *Cadeau* does not imply that the tradition applies unaltered and that these payments actually fulfill different roles. A simple explanation for the coexistence of the two payments could be that the social norm setting the acceptable amount of the bride price remains very pregnant. It sets lower and upper bounds that are close enough together to limit the margin of negotiation. In such a case, if the payment from the groom that has been negotiated between the families surpasses the socially determined level of the bride price, the payment of a *Cadeau* could be a complement to reach the total negotiated amount. This apparent sharing between the amounts received by the family and by the bride herself might fulfill social functions but would be meaningless in practice, since the final split between them can be achieved through subsequent intra-family transfers.

If the above were true, with a total amount negotiated between families and paid in two parts to conform to social norms, then bride price and *cadeau* would be perfectly fungible. In particular, these two payments would affect the bride's well-being in the same way, and studying them separately would bring few insights.

In this case, what would matter is the total payment negotiated between families TP. To be socially acceptable, it is shared into two amounts labeled bride-price and *Cadeau*, respectively denoted BP and Ca.

$$TP = BP + Ca. \tag{1}$$

A share of this total marriage payment will subsequently be attributed to the bride by her family, irrespective of the amount that was labeled as *Cadeau*. The well-being of the woman in her marital life depends on this total payment, rather than by the bride price and the *Cadeau* taken separately. Denoting well-being outcomes by Y, we would expect

$$\frac{\partial Y}{\partial Ca} = \frac{\partial Y}{\partial BP} > 0 \tag{2}$$

In empirical models seeking to assess the relationship between marital payments and wife's well-being outcomes, a simple way to test for potential fungibility between bride price and *Cadeau* is therefore to test for the equality of coefficients of the corresponding variables.

Table 4 displays an excerpt of the results presented in Table 8 (Section 6). It emphasizes the results of this test of equality of coefficients for the two main welfare outcomes considered in this paper. Those outcomes (detailed in Section 4) are a measure of the wife's relative access to household consumption on the one hand, and a measure of the financial contribution of the husband to the wife's own consumption on the other. Table 4 shows the coefficients obtained from OLS regressions of those outcomes on a number of correlates, including the various marriage payments (see details in Section 6). Although power is limited, we reject the hypothesis that the coefficients attached to the bride price and to the *Cadeau* are equal for the first outcome when the whole sample is considered (column 1). Further, while the coefficient associated with the *Cadeau* is significantly positive, that associated with the bride price is not significantly different from zero. For reasons explained in Section 4, the second outcome is only available for a sub-sample of women. In this sub-sample, we lack the power to reject equality of coefficients when the wife's relative access to consumption is considered (col. 2). This is also the case for the regression of the financial contribution (col.3), but here the p-value of the test is equal to 0.17. Table 11 in Section 7 shows that the equivalent regression on the sub-sample of coresident women yields coefficients for the *Cadeau* and the bride price that are significantly different from each other (p-value = 0.08). Here again, the *Cadeau* is strongly positively correlated with the financial support, while the bride price is not.

All in all, these results suggest that we cannot simply consider these transfers as fully fungible. There may be two non exclusive reasons for this lack of fungibility: either these transfers reflect different motivations or there is an unobservable variable that is correlated with one transfer in a different way than with the other. Al all events, we need a new framework to think about them.

3.2. The Cadeau as a signal

To clarify the potential mechanisms at play, we now present a simple model that accords with anthropological knowledge about marriage payments in Senegal and with the additional insights from our qualitative field work, as presented in Section 2. We will use this model to guide our reading of the empirical regularities found in the Senegalese data and provide a plausible rationale for the observed patterns. This is not a model of marriage, as we assume that the match is already fixed. We only consider the stage where decisions on marriage payments are made, assuming the bride price is a market price while the *cadeau* is used to improve the quality of the match by generating cooperation between spouses.[9]

[7] Annual expenditures per capita measured in PSF is 328,000 CFA Francs 2005, or about $573.

[8] The correlation table looks very similar when all marriages are considered, see Table A.2 in the Appendix.

[9] Despite important differences, the work of Bloch et al. (2004) on wedding celebrations in rural India was very inspirational.

Table 2
Value of the marriage payments.
Source: PSF 2006.

	N	Mean	SD	Min	Max
Bride-price (1000 FCFA 2005)	689	120.70	132.78	0.00	731.30
Cadeau (1000 FCFA 2005)	689	68.00	97.70	0.00	610.25
Bagage(1000 FCFA 2005)	689	51.47	76.69	0.00	546.87
Share of the *cadeau* in total payment to the bride's side	655	0.35	0.35	0.00	1.00
Bride-price (1000 FCFA 2005), excluding zeros	581	143.13	133.03	1.00	731.30
Cadeau (1000 FCFA 2005), excluding zeros	423	110.75	104.00	1.30	610.25
Bagage (1000 FCFA 2005), excluding zeros	383	92.59	82.31	1.02	546.87

Note: Sample: Women married between 1996 to 2006, observed in their first marriage.

Table 3
Correlation coefficients between the different marriage payments — First marriages.
Source: PSF 2006.

	Marriage payments		
	Bride-price (1000 FCFA 2005)	Cadeau (1000 FCFA 2005)	Bagage (1000 FCFA 2005)
Bride-price (1000 FCFA 2005)	1.00		
Cadeau (1000 FCFA 2005)	0.06	1.00	
Bagage (1000 FCFA 2005)	0.22***	0.21***	1.00
Observations	689		

Note: Sample: First marriages taking place between 1996 to 2006.

Table 4
Testing for fungibility: Consumption outcomes.
Source: PSF 2006.

	All wives	Wives who are not in the cell of their husband	
	Relative non food consumption of the wife's cell		Share of wife's cell expenditures financed by the husband
	(1)	(2)	(3)
Cadeau (in millions FCFA 2005)	0.4657***	0.2090	0.5049*
	(0.16)	(0.22)	(0.28)
Bride price (in millions FCFA 2005)	0.1290	0.0647	0.0630
	(0.13)	(0.15)	(0.15)
P-value for H0: $\beta\_cadeau = \beta\_brideprice$	0.10	0.56	0.17

* p < 0.10, ** p < 0.05, *** p < 0.01.
Note: OLS estimates. Dependent variable, columns (1) and (2): ratio of the wife's cell non food expenditure per capita to that of the household. Column (3): share of wife's cell expenditures financed by the husband.
Marriage payments amounts are expressed in millions FCFA 2005. The following controls are included: amount of the *bagage*, education and age at marriage of the wife, whether she lives in a rural area, and dummies for the occupation of the wife's father and for her ethnic group, occupation of the husband, composition of the household (number of children and number of adults in the household and in the cell), dummy for monogamous union, dummy for first wife if polygamous, dummy for higher ranked wife if polygamous and logarithm of the household expenditures per capita. We include region and marriage year fixed effects. Standard errors clustered at the level of the sampling unit in parentheses.
Sample: Women who married between 1996 and 2006 (col. 1) and who are not in the cell of their husband (col. 2 and 3).

In our setting, love between the future spouses does not play a role in the decision on the match: family and social considerations drive the choice. As a result, it is up to the future spouses to try to engage in their marriage in a way that ensures they reach a harmonious, caring equilibrium which will generates utility benefits for both of them, relative to the same match without this caring relationship. The groom is the first player, and will set the tone through his actions. If he cares for this particular bride – if he loves her – he will strive to signal this so as to maximize the chances of her responding to this love. Conversely, if he does not love her, it will be too costly for him to send an insincere signal. Our model is therefore aligned with the literature that sees marriage itself as a signal of true love (Rowthorn, 2002). In the context of Senegal, as marriage does not necessarily reflect love, it cannot play this role. Instead, the *Cadeau* is used for this purpose. Indeed, due to the limited and asymmetric premarital information newlyweds have about each other, the matching process is not based on all the relevant information, resulting in inefficient marriage market outcomes. The *Cadeau* is a way to mitigate ex-post the cost of those inefficiencies by emulating the outcome of an efficient match.

The match is decided by agreement between the two families.[10] Both families and the groom discuss the bride price, which should be sufficient for the bride's family to hold a wedding ceremony that is impressive enough to maintain their social standing. What is appropriate is very much a matter of social norms, setting out what is expected from each family, given their social status and the existing relationship with their future in-laws. The bride price might also reflect the local marriage market. Hence, the groom (or his family) offers to pay a bride price BP. For this amount to be accepted and the marriage to be allowed, this price cannot be below that customarily determined by $\overline{BP} = BP(z_w, z_h, m, sn)$, where the individual characteristics of husband and wife are denoted by (z_h, z_w), m stands for the marriage market conditions favorable to men (gender imbalance for example), and sn denotes the social norms that apply to a particular marriage (due to the ethnic affiliation, regional practices, the families social standing, etc.). z_w encompasses, for example, the age and education level of

[10] Women who have never been married before have much less power of decision than anyone else about the marriage itself.

the bride. z_h includes information on the husband's occupation (for instance, whether this occupation provides a stable income). Note that the husband's current income is not observed by the bride's family, so that the negotiation will be based on perceived wealth status and earning capacity rather than actual income. The employment status of the husband is one of the signals taken into account.

After the match is decided, the groom discovers how much he loves the bride and how much he aspires to this particular match, and this is private information. He then has to decide whether to give a *cadeau* to his future wife and how much it should be. The intensity of the groom's interest in the bride is denoted l (for love) and is a continuous variable. The *cadeau* (Ca) is a way for the groom to signal this love. The main objective of this signal is to ensure the wife's reciprocal commitment to the marriage. In fact, the main choice that brides face is how they will behave with their husband during their future marital life. As in any repeated game, cooperating at the beginning of a marriage helps ensure cooperation in subsequent periods, and the *cadeau* is received as a cooperative signal. The more importance the groom attaches to marrying this particular bride, the more willing he will be to secure her cooperation. Men can differ in their interest in conciliating the bride, because the utility they derive from the reciprocal involvement of the bride increases with their love. In our model, this means that men can differ in their net signaling cost, as the direct monetary cost is counterbalanced by idiosyncratic returns (mostly emotional) that increase with the love of the husband: the less the groom is in love with the woman, the more it costs him to give a *cadeau*.

When she receives the signal, the bride decides whether or not to cooperate in the future relationship. She will cooperate if the signal sent reflects a high enough level of love from the groom, with the minimum level she requires given his characteristics (education, wealth of his family, employment...) being denoted $\overline{l_w}(z_h)$. If she has no other source of information because she does not know the groom, she will form an expectation of his level of love based on the *cadeau*. In the knowledge that the *cadeau* is costly and that only a sufficiently motivated groom would pay it, the wife can infer the intensity of love through this payment. Her cooperation generates a utility benefit for the spouses. Indeed, as underlined by Becker (1974), love in a marriage, because it implies caring, is a source of utility gains as it reduces the cost of transfers within the couple and increases the importance of public goods. Since caring implies that one derives utility from the consumption of the other, it also leads to more equal sharing of resources within the household. Hence, by signaling love, the *cadeau* also signals the husband's future financial support to his wife over the course of the marriage.[11] The families do not benefit from this particular source of utility gain.

To model the way the bride forms expectations of the groom's love, we introduce a measure of the degree of premarital knowledge between the spouses. The potential bride directly observes the groom's love for her, l, with probability π. Note that π could also be more broadly interpreted as a measure of the positive prior believes that the bride has about this husband, driving her trust in his future marital behavior. π is probably higher if both spouses pertain to the same kin or ethnic group, but could be low in the event of an arranged marriage. Since arranged marriages occur more often within kin groups (in particular due to cultural preferences for cross-cousin marriages), the question of whether kinship ties contribute to higher π is ambiguous. With probability (1-π), the bride does not know the extent of the groom's attachment and can only form expectations in this respect though the *cadeau*. Expectation of the groom's love induced by the *cadeau* is an increasing function, the inverse of the signaling mechanism, denoted $q(Ca)$, where $q(0) = 0$, $q' > 0$. In all, the bride's expectation of the future involvement of the groom is written $E(l) = \pi.l+(1-\pi).q(Ca)$. It increases with the level of the *cadeau* Ca. For her to decide to cooperate, this expectation needs to exceed $\overline{l_w}(z_h)$, the minimum love intensity she requires. Cooperating has a cost for her, but also allows her to reap the emotional benefits of living in an harmonious relationship. If the groom is genuinely interested in this marriage, he seeks to send a signal that would exceed his expectation of the bride's threshold, as failing to meet the wife's anticipations would prevent him from reaping the utility gain associated with having a harmonious marriage with the woman he actually cares for.

Groom's utility Below, we make the simplifying assumption that the groom is the sole decision maker regarding both the bride price and the *cadeau*, with the positions of other parties coming into play through minimum requirement constraints.

The groom derives utility from consumption and from the emotional quality of his marriage. The utility associated with the emotional benefit of marrying this particular woman and having a harmonious marital life is denoted $v(l, x, z_w)$, where v is strictly increasing. The second derivatives with respect to the three arguments are assumed to be negative. In addition, the crossed derivatives are assumed to be positive: a loving husband derives greater utility from his wife's cooperation than an indifferent husband. Hence, the groom's returns on signaling increase with the intensity of his love. This insures the incentive compatibility of the signaling mechanism. This utility can only be enjoyed if the signal sent leads the bride to expect a level of love that exceeds $\overline{l_w}$, which is the level of involvement she requires to cooperate in the marriage. If the signal sent is below $\overline{l_w}$, the husband will have paid Ca in vain, resulting in a utility loss because of both the monetary loss and the failure to secure a harmonious marriage. For the sake of tractability, we assume that the utility function is continuous. We further assume that the utility of the groom is separable in consumption and emotional benefit.

Hence, the groom chooses the bride price BP and the *cadeau* Ca that maximize his utility from marrying this bride (given that the match is already decided upon), written as follows:

$$U_h = u(Y_h - BP - Ca) + v(l, x, z_w) \tag{3}$$

with:

$$x = (\pi l + (1-\pi)q(Ca) - \overline{l_w}(z_h)) \tag{4}$$

and under the following constraint:

$$BP \geq \overline{BP}(z_w, z_h, m, sn) \tag{5}$$

u and v are increasing and concave. Y_h is the groom's income. The term $x = (\pi l + (1-\pi)q(Ca) - \overline{l_w}(z_h))$ is the level of cooperation of the future wife, given by the margin by which the groom's love as she perceives it exceeds (or misses) her threshold for cooperation. For a barely involved groom, $v(l, x, z_w)$ will be almost null, and the interest in increasing $\pi l + (1-\pi)q(Ca) - \overline{l_w}(z_h)$ will be low (to the point that he might choose $Ca = 0$ if the utility loss due to the monetary cost of the Ca is not dominated by the utility gain in terms of emotional benefits), whereas not sending a valuable signal would be very damaging for the utility of a highly involved groom. As a result, only a groom who is sufficiently in love will have the incentives to pay a *cadeau*.

Saturation of the constraint leads to the following:

$$BP = \overline{BP}(z_w, z_h, m, sn) \tag{6}$$

and the first order condition on Ca gives the following:

$$-u'(Y_h - \overline{BP}(z_w, z_h, m, sn) - Ca) + \frac{\partial v(l, x, z_w)}{\partial x}(1-\pi)q'(Ca) = 0 \tag{7}$$

[11] Our model therefore implies that the correlation between the *Cadeau* and the sharing of household resources is due to the caring equilibrium it induces. Outcomes in terms of the wife's consumption might therefore not differ fundamentally from those that would ensue from a model where the *Cadeau* increases the bargaining power of the wife. Nevertheless, in the context under study, we do not think that the *Cadeau* can strengthen the wife's outside options, as the amounts are not substantial enough and the *Cadeau* now includes very little in the way of assets.

For the bride price, the results of the comparative statics are directly obtained from the hedonic price function. For the *cadeau*, we compute the implicit derivatives as follows. In the case where q is concave ($q'' \Leftarrow 0$), we can determine the sign of most of these derivatives.

- $\frac{\partial Ca}{\partial \pi} = -\frac{q'(Ca)((1-\pi)\frac{\partial^2 v}{\partial x^2}(l-q(Ca)) - \frac{\partial v}{\partial x})}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2} < 0$
- $\frac{\partial Ca}{\partial Y_h} = -\frac{-u''}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2} > 0$
- $\frac{\partial Ca}{\partial m} = -\frac{u''\frac{\partial BP}{\partial m}}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2} > 0$
- $\frac{\partial Ca}{\partial z_h} = -\frac{u''\frac{\partial BP}{\partial z_h} - \frac{\partial^2 v}{\partial x^2}(1-\pi)q'(Ca)\frac{\partial \overline{l_w}}{\partial z_h}}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2}$
  whose sign is ambiguous.
- $\frac{\partial Ca}{\partial z_w} = -\frac{u''\frac{\partial BP}{\partial z_w} + \frac{\partial^2 v}{\partial x \partial z_w}(1-\pi)q'(Ca)}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2}$
  whose sign is ambiguous.
  $\frac{\partial Ca}{\partial z_w} > 0$ if the link between the wife's characteristics and the emotional utility the groom will derive from marrying this particular wife is stronger than that between those characteristics and the bride price.
- $\frac{\partial Ca}{\partial l} = -\frac{(1-\pi)q'(Ca)(\frac{\partial^2 v}{\partial x \partial l} + \pi\frac{\partial^2 v}{\partial x^2})}{u'' + (1-\pi)q''\frac{\partial v}{\partial x} + \frac{\partial^2 v}{\partial x^2}[(1-\pi)q']^2} \geq 0$. It varies between 0 (if $\pi = 1$, i.e. groom and bride already know each other) and a positive value if $\pi = 0$, provided that the second derivative of v with respect to x is not too negative.

The results of the comparative statics are summarized as follows:

Variables	Effect on *cadeau*	Effect on bride price	
Level of knowledge about the groom	–	0	(1)
Income of the groom	+	0	(2)
Quality of the bride	?	+	(3)
Quality of the groom	?	+	(4)
Marriage market favorable to men	+	–	(5)
Love	+	0	(6)

Wife's utility In a second step, we focus on the situation during marital life once the ceremony has taken place, and consider the wife's utility. It also has two separately additive components. First, an increasing function of her consumption C_w and of some non-monetary dimensions of marital well-being, denoted as A (housing independent from the in-laws, for example) represents the material aspects of her utility. Her consumption depends in part on the financial support she obtains from her husband, S, as well as her characteristics z_w that relate to her capacity to generate her own resources. A second component of her utility function describes the emotional benefit from cooperating to achieve a harmonious marriage, which has a direct cost $c(x) = -x^2/2$ and delivers returns that are increasing with the husband's love $x.E(l)$. Her utility is written as follows:

$$U_w = u(C_w(S, z_w), A) + x.E(l) - x^2/2 \tag{8}$$

When optimizing, she will choose a level of cooperation which is exactly equal to her expectation of the groom's love: x = E(l), as described in the preceding sub-section.

We assume that the groom's love, or the harmony in the couple, implies caring and therefore plays a positive role in the groom's financial support for his wife. This would mean the following: $S = S(\underset{+}{l})$, where S is the groom's financial support, assuming that the other explanatory variables are constant (fixed at the time of marriage). Since we are expecting $\frac{\partial Ca}{\partial l} > 0$, we also expect $\frac{\partial S}{\partial Ca} > 0$, whereas $\frac{\partial S}{\partial BP} = 0$ when controlling for the observable variables that affect the occurrence of the marriage. The exact same reasoning applies to the wife's consumption level C_w and her non-monetary well-being A, which, given their observed characteristics, are also determined by the groom's unobserved love for her and therefore should be positively correlated to the *cadeau* but not to the bride price.

Finally, the *bagage* does not appear in the above model, as the husband and his family have no say on this matter, even though it may also be partly financed by the *cadeau*. It is more likely to be determined by the support the bride can obtain from her own family and by the structure of the household she is planning to join (the presence of co-wives or in-laws in particular). The role of her own family suggests that succeeding in raising a large *bagage* bodes well for the future support of her kin group. As such, it could be correlated with future income transfers, for example, and therefore with higher individual consumption. Furthermore, it might well reflect the strength of her outside options and hence contribute to greater bargaining power within the household.

Empirical model We will pair these predictions with the data. We first focus on the correlates of the marriage payments and thus estimate the following:

$$P_i = g(sn_i, z_{hi}, z_{wi}, m) + v_i \tag{9}$$

where P stands for payment, which can be either a bride price (BP), a *cadeau* (Ca) or a *bagage* (T). Some unobserved factors linked to the personality traits of the husband and wife and the interpersonal quality of the match are likely to come into play for all these payments in the error term v. Love specifically plays a role in the *cadeau* in the model and is encompassed in the error term of the corresponding regression (v_{Ca}).

In a second step, we look at the link between the payments and the welfare of the wife in her new household after the marriage. Here, again, we show regularities thanks to the following set of regressions:

$$Y_i = g(m, sn_i, z_{hi}, z_{wi}, Ca_i(l), BP_i, T_i) + u_i \tag{10}$$

If marriage payments were perfectly fungible, the coefficient associated with Ca_i should be equal to that associated with BP_i. We have shown above that this prediction is rejected by the data. Our model, where the *Cadeau* is a signal, instead suggests that the coefficient associated with Ca_i should be significantly positive, while the coefficient associated with BP_i might not be significantly different from zero. Indeed, controlling for the observable variables that affect both the payment and the wife's outcomes, we expect the unobserved characteristics captured by the *cadeau* (kindness of the husband, quality of the marriage, harmony in the couple), more than those captured by the bride price, to play a role in determining the wife's access to household resources and thereby contribute to the correlation with the wife's well-being (Y).

4 Data and descriptive statistics

4.1 Data

Survey The data used in this study are from the PSF Survey (De Vreyer et al., 2008).[12] The data were collected in 2006 and are nationally

[12] Momar Sylla and Matar Gueye of the Agence Nationale de la Statistique et de la Demographie of Senegal (ANSD), Philippe De Vreyer (University of

representative. This survey covers 1750 households and 14 450 individuals. It records all the marriage payments: bride price, *cadeau* and *bagage*.[13] This level of detail is rare; data sets that record bride prices or dowries usually stop at this single marital transfer. The only exceptions we know of are Bangladesh and Pakistan, where bride prices and dowries tend to increasingly coexist (Ambrus et al., 2010). In Senegal, the existence of other marriage payments, in addition to the nearly universal bride price, is common. These marriage payments were recorded on the basis of the husband's declaration when he was available and his wife's when he was not. As such, these reported payments can be biased (beyond a random measurement error). We do not think that the bias would systematically correlate with the outcomes considered at the time of the survey but rather, potentially, to the education level of the bride or the consumption level of the household. Thus, we control for these variables in the analysis.

Consumption The PSF survey collects information on food and non-food expenditures, which include electricity, clothing, furniture, hobbies, education, hygiene and cosmetic products, and transportation. The recall period for each good is chosen by the respondent, and expenditures are then annualized. A particular strength of this data set is that it takes into account the intrahousehold allocation of consumption. The qualitative interviews showed that each household can be split into semi-autonomous budgetary units, between which the sharing of financial responsibilities is very clearly defined and individual resources are not pooled. In the quantitative data, this natural division of the household is reproduced, each unit being called a "cell". These cells are composed of a cell head and their dependents. Household heads are recorded in a cell which includes only their unaccompanied dependents (e.g. children whose mother does not reside in the household or a widowed parent, for example). Their wives each head a separate cell.[14] Married adult men, other than the household head, receive different treatment depending on whether they are polygamous: they are registered in the same cell as their wife if they are monogamous or in different cells if they are polygamous. Thus, most women heading a cell of their own are either the household head or married to the household head.[15]

Consumption is recorded in three parts: consumption common to the whole household, consumption that can be assigned to specific cells and consumption shared between several cells but not the whole household. Total cell consumption can be constructed by ascribing a share that is proportional to the cell size of the common or shared expenditures and adding cell-specific expenses. This allows us to observe that individuals within the same household do not always have the same consumption level. The data show that food consumption is generally equally shared within a household, while non-food consumption is not (De Vreyer and Lambert, 2021).[16] We will consider the ratio of a woman's cell per capita non-food consumption to that of her household as a measure of her access to the household resources. Note that women who are not in an independent cell are generally registered in their husbands' cell, and the amount of resources that reaches that cell also reflects the position of the couple in the household. This is a relevant dimension of a wife's situation within the household, even though it does not provide insight into what she can obtain from the husband. Results will be presented for all women together and for the sample of women heading their cell.

For each consumption record in the survey, the people who finance the corresponding expenditures are registered. We can therefore consider another outcome reflecting the support the husband provides to his wife, i.e., the share of the wife's cell consumption that is financed by the husband. We are aware, however, that this measure is ambiguous. A high level of support from the husband could also mean less autonomy and therefore lower welfare for the wife. This is the same ambiguity that is attached to the wife's income, as highlighted by Doss (1996); the wife's income might not be a good measure of bargaining power since a woman with a high level of bargaining power might decide not to work. Note that consumption data do not suffer from this ambiguity. We complete this analysis by studying other outcomes that can proxy women's welfare, such as fertility pressure, polygamy and coresidence with the in-laws. This is detailed in Section 6.

Wealth We have no direct measure of a husband's wealth prior to marriage; however, we observe his employment status, that of his father, and, for the subsample of co-residing couples, whether he already had an income-earning occupation before the marriage.[17] We use these variables as proxies for the economic standing of the husband and that of his family.

Rainfall We have no information about the husband's income at the time of marriage, but we can nevertheless use information on local rainfall to proxy for income shocks. Rainfall data measured every month from 1982 to 2007 at district level are matched to every individual in the survey, based on the wife's district of residence at the time of the PSF survey.[18] This is the district in which the wife married, and is therefore likely to be a good approximation of the district of residence of the husband's family. It makes sense to use this district, since the aim is to approximate the husband's income and that of the husband's family at the time of marriage. The wife's current residence district is probably a noisier approximation of the exact location of the wife's family. The wife's birth district is more appropriate to account for this location, and would be relevant if the girl's parents adjusted the timing of the marriage to cope with shocks.

To construct a measure of rainfall shock, district annual rainfall averages are first computed, and the long-term average is obtained by taking the mean of the yearly rainfall average over the twenty-five years for which the information is available.[19] For each household and each year, we define the positive (negative) rainfall shocks as situations where the rainfall average that year is more than one standard deviation above (below) the long-term average. We focus on weather shocks that occur when women are most at risk of being married for the first time (between the ages of 16 and 18). Unfortunately, we can

Paris-Dauphine and IRD-DIAL), Sylvie Lambert (Paris School of Economics-INRAE) and Abla Safir (World Bank) designed the survey. The data collection was conducted by the ANSD.

[13] Recording transfers from the bride's family to the groom's family failed due to heterogeneity in the understanding of the question by enumerators. Some of them understood that participation in ceremonial expenses was not to be recorded, while others included such expenses. As a result, we chose not to use this information. Only 15% of the marriages are concerned.

[14] The only case when a household head and his wife are recorded in the same cell is when they do not live in the same household but one was visiting the other at the time of the survey. This happened for 10 women in our sample.

[15] Single mothers living with kin would also head their cell, as well as the wives of polygamous household members.

[16] Meals are taken out of a common dish; thus, it is virtually impossible to actually record individual intake levels for meals that are taken at home. We might therefore underestimate the actual inequality related to food consumption. Nevertheless, inequality is likely to be rather limited in such a setting compared to a situation where everyone has access to an individualized portion.

[17] Employment status describes the type of position held: employer, civil servant, employed in the formal sector, employed in the informal sector, self-employed or farmer.

[18] Data used are the CHIRPS Data. CHIRPS was created in collaboration with scientists at the U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center to deliver reliable, up-to-date, and more complete datasets for a number of early warning objectives (such as trend analysis and seasonal drought monitoring) using satellite data and precipitation grids produced from station data. They can be downloaded at this address: http://chg.geog.ucsb.edu/data/chirps/.

[19] We concentrate on the rainy season, which covers the June to October period.

Table 5
Married women's characteristics.
Source: PSF 2006.

	N	Mean	SD
Wife with some primary education	809	0.22	0.42
Wife with secondary or superior education	809	0.12	0.33
Age of the wife at marriage	809	22.45	8.73
Age Difference between spouses	696	11.53	7.83
Log of the expenditures of the hh pc	809	12.31	0.78
Wife lives in a rural place	809	0.51	0.50
In a monogamous union	809	0.75	0.43
In a polygamous union, first rank	809	0.04	0.20
In a poly. union, sec. or further rank	809	0.21	0.41
Relative non food consumption of the wife	809	1.04	0.56
Share of the wife's cell expenditure financed by the husband	731	0.54	0.44
Presence of in-laws	802	0.36	0.48
Polygamous husband	809	0.25	0.43
Number of months between marriage and first birth	746	26.82	26.47
Negative rainfall shock at 16, 17 or 18 years old	745	0.21	0.41
Positive rainfall shock at 16, 17 or 18 years old	745	0.34	0.47

Note: Sample: Marriages from 1996 to 2006. The information on husband's age is missing for some non-coresiding women, thus the missing observations for the age gap. The share of the wife's cell expenditures financed by the husband is only computed for women who are heading a cell. Number of months between marriage and first birth can only be computed when marriage date is precise enough. In a number of cases, only the year of marriage was provided.

only do this for the women who were of marriageable age during the period covered by our rainfall data. This constraint excludes women aged over 42, as the rain data are available only from 1982 onwards. Consequently, these variables are only available for a subsample of 745 women.

The last panel of Table 5 presents descriptive statistics on the occurrence of shocks.

Sample The amounts recorded for the marriage payments may suffer from recall bias. We therefore limit our sample to women who got married in the 10 years preceding the survey (after 1996). The sample for which information on the amount of each marriage payment and the control variables (such as education) is available contains 809 women, after trimming for outliers.[20] Although all married women were asked about their husbands, we have more information on the husbands in case of coresiding couple; i.e., 558 women living with their husband (69% of the sample).[21] The analysis of the financial support of the husband cannot be undertaken when the husband and wife are registered in the same cell, as their consumption is not recorded separately in this case. We therefore restrict the analysis of this outcome to the sample of wives who are heading their cell (503; of these, 342 coreside with their husband).[22] We check the robustness of the results to the sample choice; we do so first by restricting in turn the analysis to women in their first marriages (689 women, of whom 411 are cell heads) and to coresiding women (558 women, of whom 342 are cell heads[23]), then by extending the sample to women who married in the 15 years preceding the survey (1059, of whom 720 are cell heads). Table A.5 in the Appendix provides a summary of the number of observations in these different samples of interest.

Married women's characteristics Table 5 provides descriptive statistics for the women in our main sample.[24]

Twenty-two percent of those women report having attended primary school, and 12% report having at least some secondary education. Half of the sample live in a rural area. The average age at marriage is 22 years old and the age gap with the husband is 11.5 years. Note that for some of these women, the marriage observed is not their first marriage, which explains the rather high age at marriage reported herein. For first marriages, the average age at marriage is 20 (see Table A.6). Three-quarters of the wives report living in a monogamous union at the time of the survey.[25]

5 Correlates of marriage payments

To analyze the correlates of the various payments, we estimate both the probability of such transfers taking place at the time of marriage, and the amount paid. The explanatory variables are grouped into different sets. The first set of variables describes the local environment and aims to capture the role of local norms. It includes the region of residence of the couple (as a proxy for the region of residence of the husband's parents, given the prevailing patrilocal customs), dummy variables for ethnic groups, and average per capita consumption at the district level (to control for the wide geographic disparities in living standards).[26] We also include the date (year) of the marriage and the conditions of the local marriage market faced by the man at that time, as captured by the women-to-men sex ratio in the district of residence of the wife (following Chiappori et al. (2002) and Abramitzky et al. (2011)). Using the district of residence of the wife is convenient as it is observed for all women and is usually also the district of residence of the groom at the time of marriage. However, when husband and wife do not co-reside, this variable might not capture as accurately the

[20] To avoid potential errors, we have excluded the last percentile for every marriage payment. Thus, the sample for which the control variables were known, initially 850 women, was restricted to 825. We also excluded the last percentiles of our main outcomes, namely, the non-food consumption per capita and of the relative non-food per capita, to avoid outliers biasing our results.

[21] Non-coresidence can happen in different situations: (i) very recent marriages, if the wife has stayed with her parents and is waiting to join the conjugal household either because she is too young or because the bride price has not been paid in full, (ii) in certain polygamous unions where wives want (and obtain) independent dwellings, or (iii) if the wife lives in the village, while the husband is based in town for his work and only comes for regular visits.

[22] Three quarter of married women who are not heads of their cell are married to monogamous men who are not heads of household. The remaining 25% of them do not reside with their husband and are most often the daughters of the cell head.

[23] Among them, 310 are wives of household's head.

[24] Other samples are described in the Appendix, Tables A.6, A.7, A.8, A.9 and A.10.

[25] This figure is higher than the national average (62%), but women in the sample are recently married, and their husbands may marry a second wife in the future.

[26] Throughout the paper, the term district refers to the territorial division called a department in Senegal. There are 45 departments in the country.

conditions of the relevant marriage market.[27] A second set of variables reflects the endogamy of the match in various dimensions, such as whether the spouses belong to the same ethnic group and family, or to the same ethnic group but different families. When women co-reside with their husband, we also observe if their respective fathers share the same employment status, which is one dimension of social endogamy. Family characteristics make up the third group of variables, including the professional occupation of the woman's father (whether employer, employee, civil servant, formal or informal worker, farmer or inactive), whether the woman's parents were alive at the time of marriage, and the number of siblings of each spouse. Finally, the individual characteristics of the wife and husbands make up the fourth and last set; these include education and occupation.

We investigate the association between the dependent variable and the sets of characteristics for all married women. The results are presented in odd columns of Table 6 for the logit estimation of the probability of a given transfer taking place, and in even columns for the corresponding amounts (given the share of null payments, we conduct this analysis using a tobit specification). Table 7 replicates the same analyses for the subset of women who coreside with their husbands. These results are very similar to the results obtained by using the whole sample of married women, though coefficients are more precisely estimated. This is likely due to the fact that some variables are better measured for this sub-sample. Furthermore, for co-residing wives, more information about the husband and his family background is available. We present the results using a broader set of explanatory variables in the Appendix (Table A.11).[28]

For both the existence and level of the bride price, the explanatory variables related to region and date of marriage have significant explanatory power. For women co-residing with their husbands, the district-level women-to-men ratio at the time of marriage plays a negative role for both the probability of a bride price being paid and its amount, highlighting the influence of local conditions on the marriage market. This is true even when controlling for the average consumption level in the department, which could be correlated with the sex ratio if men migrate to earn a living. As expected, this measure of the local living standard is positively correlated with bride price. For the full sample, the coefficients attached to the women-to-men ratio are lower and not significant, reflecting the fact that this is a much noisier measure of marriage market conditions when spouses do not co-reside.

The wife's age at marriage is important, as it affects both the probability of a bride price being paid and its amount. Older brides are less likely to receive a bride price, and the amount is usually lower, especially if this is not their first marriage. Women with a secondary or higher education tend to command higher bride prices; however, it should be remembered that only 12% of our sample had this level of education, an achievement that may be more indicative of her family's social standing than of her own qualities. Additionally, higher bride prices are paid when at least one of the bride's parents is alive at the time of marriage. This is because the parents rely on the bride price to reaffirm their social standing and therefore have high stakes in negotiating it.

Husbands with higher employment status (job in the public sector or as employers) pay a higher bride price. This effect disappears for the subsample of co-residing wives, which is probably due to the more frequent occurrence of separate dwellings for spouses among this group of men.[29] For co-residing women, higher bride prices are also paid if the husband is a farmer.

On the other hand, belonging to the same ethnic group, whether from the same family or not, is not significantly correlated with the bride price.

Regarding the *cadeau* or the *bagage*, it is worth noting that, although these payments vary by region and marriage date, they do not vary by district consumption level or marriage market conditions. This supports the notion that these payments are determined at a more individualized level than bride prices. The *cadeau* appears to be determined by the characteristics of the spouses, both in terms of the probability of a *cadeau* being given (which is particularly high when the husband is a farmer) and the value of the *cadeau*.

Educated women, even with only primary education, receive a *cadeau* more often and of a higher amount. Younger brides also get larger *cadeau*. Men who are civil servants or employers, on the one hand, and farmers, on the other, pay higher amounts. Additional results for co-residing wives presented in Table A.11 in the Appendix show that husbands who already had a job at the time of the marriage, as well as those educated in Koranic schools also pay larger amounts for the *cadeau*.

Belonging to the same ethnic group is negatively correlated with the *cadeau*, both in terms of occurrence and value, especially when spouses do not belong to the same family. The model suggests that this outcome results from better prior mutual knowledge of the spouses (or more positive prior believes from the bride about the groom), making signaling by the groom less necessary. However, this is less so for marriages within the kin group. One possible interpretation is that these marriages are likely to have been arranged by the families, without any regard for the wishes of the couple. Such a situation might require a special effort from the groom to signal his personal interest above and beyond the family's desire to see this particular marriage occur. Finally, a *bagage* is more likely to exist for coresiding women if the husband is a farmer.

Unfortunately, information on the husband's income at the time of marriage is not available in the survey. However, we can approach it in two ways for some subsamples. First, the data on the husband's job history, available when spouses co-reside, allow us to compute a dummy variable indicating whether the husband had worked before the year of the marriage. As expected, this variable is positively correlated with the amount of the *cadeau* but not of the bride price (see Table A.11 in the Appendix). Second, we can look at the impact of weather shocks at the time when women were at risk of being married for the first time, using rainfall deviation from the long-term average. As indicated in Section 4, we can only do this for the women who were of marriageable age during the period covered by our rainfall data, thereby excluding women older than 42. Table A.13 (in the Appendix) therefore reproduces the analysis adding rainfall shocks among the right hand side variables on the subsample of 745 women for whom this can be done. We also look at whether it affects the timing of marriages. Results indicate that dry years tend to delay marriages. We do not find any significant impact of rainfall shocks on the amount of the marriage payments, although the point estimate is negative and not negligible for the *cadeau*. In this context, the adjustment to drought on the marriage market passes mainly through quantities (marriage postponement). This outcome is consistent with the fact that the amount of the bride price has to respect a norm that cannot easily be disregarded. People wait for better times to marry, so as to be able to pay the required amount. At the same time, since the *cadeau* is not required, if the marriage happens in a bad year, as it might already have been difficult to collect the necessary bride price, the husband may adjust his *cadeau* downwards.[30]

[27] We define the gender ratio as the number of women aged 16 to 26, divided by the number of men aged 26 to 36, by district, using the Census data from 2002.

[28] Using all the marriages over a period of 15 years, from 1991, gives very similar results. These results are presented in Table A.12 in the Appendix.

[29] 37% of men working in the public sector or as employers have at least one non-coresident spouse, while this is the case for a quarter of the farmers.

[30] We performed the same analysis using the district of birth of the wife instead of her district of residence. We have this information only for the second wave of the panel; therefore, we can have the rainfall deviations only for the people who have been successfully tracked between the two waves.

Table 6
Marriage payments, All marriages.
Source: PSF 2006.

Contribution	Bride price		Cadeau		Bagage	
	Existence	Amount	Existence	Amount	Existence	Amount
Women-to-men ratio in the department	−0.14	−62.28	0.16	−26.30	0.17	17.07
	(0.16)	(49.50)	(0.15)	(59.79)	(0.16)	(38.33)
Average of the logarithm of the hh consumption per cap by department	0.23**	77.72**	−0.13	−15.88	0.03	17.84
	(0.09)	(37.11)	(0.10)	(31.35)	(0.12)	(44.16)
Wife is wolof	−0.00	22.37	0.03	−3.36	0.09*	12.81
	(0.03)	(15.72)	(0.05)	(14.83)	(0.05)	(14.57)
Wife is poular	−0.01	7.58	0.06	13.03	0.08	1.84
	(0.04)	(17.04)	(0.05)	(17.29)	(0.05)	(15.56)
Characteristics of the Match						
Same ethnic group, different family	−0.02	9.13	−0.19***	−57.34***	−0.10*	−27.88
	(0.04)	(17.68)	(0.05)	(15.62)	(0.06)	(17.36)
Same ethnic group, same family	0.01	8.55	−0.09	−35.63**	−0.07	−22.53
	(0.04)	(16.23)	(0.06)	(15.39)	(0.06)	(15.42)
Characteristics of the Families						
Number of siblings of the wife alive	−0.00	2.29	0.01**	3.49*	0.01	0.45
	(0.01)	(2.42)	(0.01)	(1.94)	(0.01)	(1.48)
Parents of the wife alive at marriage	0.04	38.17**	−0.00	−6.34	−0.00	−0.77
	(0.05)	(18.84)	(0.08)	(23.71)	(0.07)	(20.95)
Characteristics of the Wife						
Education (*ref. no education*)						
..... Primary	−0.03	23.39	0.13***	46.99***	0.05	20.42
	(0.03)	(14.41)	(0.05)	(14.46)	(0.04)	(13.24)
..... Secondary	0.04	112.63***	0.10	67.89***	0.09	49.37**
	(0.04)	(18.53)	(0.07)	(20.43)	(0.06)	(21.61)
Age of the wife at marriage	−0.01***	−4.16***	−0.00	−2.15***	−0.01***	−2.52***
	(0.00)	(0.75)	(0.00)	(0.78)	(0.00)	(0.72)
Wife lives in a rural place	0.04	12.68	0.03	21.46	0.04	17.29
	(0.04)	(15.33)	(0.04)	(14.39)	(0.06)	(17.57)
Characteristics of the Husband						
Professional status (*ref. independent/informal employee*)						
..... Farmer	−0.05	4.52	0.10*	37.34**	0.02	−8.11
	(0.04)	(13.79)	(0.06)	(16.14)	(0.06)	(13.08)
..... State employed/employer	0.01	25.63*	0.06	34.40**	0.04	16.73
	(0.03)	(15.48)	(0.05)	(15.50)	(0.05)	(14.32)
..... Other	−0.03	31.20	−0.02	4.35	0.06	4.48
	(0.05)	(19.40)	(0.09)	(21.13)	(0.08)	(16.63)
Constant		−814.97*		308.02		−183.74
		(487.50)		(414.16)		(568.58)
sigma		138.95***		122.94***		112.07***
		(7.76)		(6.76)		(8.63)
Region and marriage year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pval_region + marriage year	0.08	0.00	0.00	0.00	0.00	0.00
N	809	809	809	809	809	809
Dep. Var. mean	1.00	109.65	1.00	62.17	1.00	47.86
st. dev	0.00	130.85	0.00	92.92	0.00	74.69
Pseudo-R2		0.02		0.02		0.02

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Odd columns: Average marginal effect of Logit estimates, Dependent variables: occurrence of marriage payment, standard errors clustered at the level of the sampling cluster in parentheses. Even columns: Tobit estimates, Dependent variables: amount of marriage payment expressed in 1000 CFA 2005, standard errors clustered at the level of the sampling unit in parentheses.
Omitted occupation category for the husband: independent or informal employee. For occupation dummies "inactive" and "unknown", coefficients (not displayed here) are never significant. Same holds for the dummies "unknown" for the endogamy variables. Additional control: occupation for the wife's father.
Sample: Women who married between 1996 and 2006.

Summing up Results can be read in the light of the conceptual framework developed above, which allows us to make sense of the patterns just described. Bride price payments appear to be decided mainly on the basis of local norms, which vary by region, the local standard of living, the local sex ratio at the time of marriage and whether the bride's parents are alive (for women of a given age). In contrast, the *cadeau* seems to be more individualized, with the characteristics of the spouses playing a greater role. The negative correlation between endogamy and the *cadeau* can be understood in our framework by the fact that signaling his goodwill is more important for the husband if he is more distant from his future wife to start with; however, this effect is attenuated in the case of an arranged marriage, as proxied by family endogamy.

The unexplained variance could be ascribed to two non-exclusive factors. The first is measurement error: although we restrict the sample to relatively recent marriages, the participants' recall or reporting may be imperfect. The other possibility is the role of unobservable characteristics such as the kindness of the husband, the value he attaches to marrying this particular woman, and the outside options in the marriage market for this particular woman. Analyzing how those transfers correlate with the welfare outcomes of the wife after marriage will help us assess whether noise dominates or whether the payments recorded carry a relevant signal beyond that contained in the observable characteristics.

This restricts the sample to 576 women. The results using the district of birth of the wife are similar to the previous results. The results also hold when the sample is restricted to first marriages. These additional results are available upon request.

Table 7
Marriage payments, Coresiding wives.
Source: PSF 2006.

Contribution	Bride price		Cadeau		Bagage	
	Existence	Amount	Existence	Amount	Existence	Amount
Women-to-men ratio in the department	−0.36**	−149.62**	0.20	42.68	0.15	16.03
	(0.17)	(59.31)	(0.17)	(63.89)	(0.18)	(40.23)
Average of the logarithm of the hh consumption per cap by department	0.21**	48.46	−0.10	−25.37	0.07	28.80
	(0.10)	(39.44)	(0.10)	(30.30)	(0.13)	(44.38)
Wife is wolof	−0.02	18.88	0.03	14.92	0.09	17.30
	(0.04)	(18.10)	(0.05)	(15.44)	(0.06)	(14.49)
Wife is poular	−0.02	0.43	0.10*	33.62*	0.01	−9.71
	(0.05)	(19.13)	(0.06)	(18.30)	(0.05)	(14.45)
Characteristics of the Match						
Same ethnic group, different family	0.01	25.14	−0.18***	−69.15***	−0.09	−30.23
	(0.05)	(19.69)	(0.07)	(19.63)	(0.07)	(18.65)
Same ethnic group, same family	0.03	18.28	−0.11*	−53.23***	−0.11	−30.14*
	(0.05)	(19.68)	(0.07)	(20.00)	(0.07)	(16.93)
Characteristics of the Families						
Number of siblings of the wife alive	−0.01	0.20	0.02**	2.31	0.01	0.31
	(0.01)	(2.88)	(0.01)	(2.21)	(0.01)	(1.62)
Parents of the wife alive at marriage	0.06	55.59**	0.03	−8.05	−0.05	−15.56
	(0.06)	(22.25)	(0.10)	(30.58)	(0.10)	(25.04)
Characteristics of the Wife						
Education (*ref. no education*)						
..... Primary	−0.00	17.16	0.11	31.01*	0.01	13.47
	(0.03)	(15.79)	(0.07)	(16.10)	(0.06)	(14.89)
..... Secondary	0.06	104.89***	0.06	39.46*	0.01	36.17
	(0.05)	(21.48)	(0.07)	(23.20)	(0.07)	(24.80)
Age of the wife at marriage	−0.00	−3.70***	−0.00	−2.50**	−0.00	−1.12
	(0.00)	(0.88)	(0.00)	(0.98)	(0.00)	(0.85)
Wife lives in a rural place	−0.03	−13.81	−0.01	5.02	0.04	19.48
	(0.04)	(18.97)	(0.06)	(15.51)	(0.08)	(20.05)
Characteristics of the Husband						
Professional status (*ref. independent/informal employee*)						
..... Farmer	−0.02	28.50*	0.16**	56.98***	0.13*	12.83
	(0.06)	(15.54)	(0.07)	(18.12)	(0.07)	(14.75)
..... State employed/employer	−0.05	15.19	0.08	33.72*	0.01	4.79
	(0.04)	(20.37)	(0.06)	(18.76)	(0.06)	(16.53)
..... Other	−0.07	28.87	−0.01	10.54	0.01	−0.90
	(0.06)	(23.20)	(0.10)	(20.35)	(0.08)	(17.08)
Constant		−338.85		349.78		−321.32
		(507.63)		(400.86)		(564.51)
sigma		132.58***		114.92***		102.87***
		(7.69)		(6.92)		(8.96)
Region and marriage year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pval_region+marriage year	0.00	0.00	0.00	0.00	0.00	0.03
N	548	558	558	558	554	558
Dep. Var. mean	1.00	117.03	1.00	62.35	1.00	53.54
st. dev	0.00	128.53	0.00	87.44	0.00	75.33
Pseudo-R2		0.02		0.02		0.02

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Odd columns: Average marginal effect of Logit estimates, Dependent variables: occurrence of marriage payment, standard errors clustered at the level of the sampling cluster in parentheses. Even columns: Tobit estimates, Dependent variables: amount of marriage payment expressed in 1000 CFA 2005, standard errors clustered at the level of the sampling unit in parentheses.
Omitted occupation category for the husband: independent or informal employee. For occupation dummies "inactive" and "unknown", coefficients (not displayed here) are never significant. Same holds for the dummies "unknown" for the endogamy variables. Additional control: occupation for the wife's father.
Sample: Women who married between 1996 and 2006 and who co-reside with their husband.

6 Wives' wellbeing

6.1 Empirical strategy

To study how measures of women's individual welfare correlate with the various marriage payments when controlling for observable characteristics, we estimate the following linear equation, which is an empirical counterpart to Eq. (10):

$$Y_{i,h,m} = \alpha_0 + \beta_1 G_i + \beta_2 BP_i + \beta_3 T_i + \gamma X_{i,h,m} + \mu_r + \nu_t + \varepsilon_{i,h} \quad (11)$$

where subscripts i, h, m and r denote individual, household, husband and region, respectively.[31] $Y_{i,h,m}$ is an indicator of the wife's wellbeing in her household. G_i is the *cadeau* she received at marriage, BP_i is the bride price paid, and T_i the value of the *bagage*. $X_{i,h,m}$ are characteristics of the wife, her household and her husband. μ_r and ν_t are dummy variables for the region and the marriage year, respectively. Finally, $\varepsilon_{i,h}$ is the error term, clustered at the level of the sampling unit.

First we examine the wife's access to household resources. As indicated in Section 4, we consider two different variables: the wife's relative non-food consumption (measured as the ratio of per capita non-food consumption of the wife's cell to the mean per capita non-food consumption of the household) and the share of the individual consumption of the wife's cell that is financed by her husband (only for wives who are not registered in the same cell as their husbands). The other outcomes considered are non-monetary proxies of the strength of the wife's position in the household. These include the probability of having become polygamous since marriage and co-residence with her in-laws (remaining monogamous and obtaining a dwelling independent

[31] There are 12 regions represented in our sample, out of a total of 14 regions in Senegal.

Table 8
Consumption outcomes.
Source: PSF 2006.

	All wives	Wives who are not in the cell of their husband	
	Relative non food consumption of the wife's cell		Share of wife's cell expenditures financed by the husband
	(1)	(2)	(3)
Cadeau (in millions FCFA 2005)	0.4657***	0.2090	0.5049*
	(0.16)	(0.22)	(0.28)
Bride price (in millions FCFA 2005)	0.1290	0.0647	0.0630
	(0.13)	(0.15)	(0.15)
Bagage (in millions FCFA 2005)	−0.1659	−0.1183	0.5573**
	(0.20)	(0.26)	(0.28)
Wife with some primary education	0.0783	0.0998*	−0.0134
	(0.05)	(0.06)	(0.05)
Wife with secondary or superior education	0.1654**	0.2231**	−0.1407*
	(0.07)	(0.09)	(0.07)
Age of the wife at marriage	0.0012	−0.0002	−0.0077***
	(0.00)	(0.00)	(0.00)
Log of the expenditures of the hh pc	−0.1258***	−0.1204***	0.0010
	(0.03)	(0.04)	(0.03)
Wife lives in a rural place	0.0408	0.0039	0.0701
	(0.06)	(0.07)	(0.06)
Constant	2.8680***	2.7308***	0.6318
	(0.38)	(0.48)	(0.41)
Region and marriage year FE	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes
Controls Husband	Yes	Yes	Yes
Controls Composition	Yes	Yes	Yes
Number of married women	809	503	503
Dep. Var. Mean	1.04	0.98	0.48
St. Dev	0.56	0.53	0.44
r2	0.24	0.28	0.22

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: OLS estimates. Dependent variable, columns (1) and (2): ratio of the wife's cell non food expenditure per capita to that of the household. Column (3): share of wife's cell expenditures financed by the husband.
Marriage payments amounts are expressed in millions FCFA 2005.
"Other Controls" include dummies for the occupation of the wife's father and for the wife's ethnic group. "Controls Husband" include the occupation of the husband. "Controls Composition" include the number of children and the number of adults in the household and in the cell, and whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling cluster in parentheses.
Sample: Women who are not in the cell of their husband, and who married between 1996 and 2006.

from one's in-laws being the preferred living arrangements). Additionally, we use the time interval between marriage and the first birth as a measure of fertility pressure. As the women in this sample married rather recently, we cannot investigate the correlates of their children's educational outcomes.

We control for the logarithm of the total consumption per capita of the household, the number of children and adults in the household and cell, the status of the wife in her household (wife of a monogamous man, first wife of a polygamous man, or wife of higher rank) except when considering polygamy as an outcome, and for the characteristics that appear to be important determinants of the marriage payments, namely, the wife's education, the age at the time of marriage and the occupation of her father and of the groom himself.

We are not claiming that the relationship between the payments and the welfare measures of the wife should be causal. As underlined in the conceptual framework, the unobserved characteristics of the wife and the husband may well affect both the existence and level of the marriage payments and the access to household resources, i.e., the bargaining position of the wife. Nevertheless, it is still of interest to observe any regularities in these relations and to use the conceptual framework developed above to interpret them.

6.2 Results

Table 8 shows that the wife's relative access to non-food consumption in the household is positively related to the value of the *cadeau* received but not to either the bride price paid or the *bagage* brought into the household, when controlling for the wife's education and the occupation of her father and husband (col. 1).[32] The significance of the coefficient of the *cadeau* nevertheless disappears when considering the women whose cell is not the same as that of their husbands (col. 2). In this latter sample, when looking at the financial support of the husband (col. 3), the correlation with the *cadeau* is positive and significant, including when we control for the other payments; however, here again, this is not the case for the bride price. It is of note that wives who are in a different cell than that of their husband and those who are registered with their husband differ in a number of dimensions, as shown in Table A.9. Women who are not in their husband's cell belong to richer households and have a lower relative consumption.[33] These women are very often the wives of household head and are more frequently in a polygamous union. These differences are driven in part by the survey design since polygamous women are never registered in the same cell as their husband. They may also reflect the stage of life-cycle that these couples are at.

The magnitude of the association between the *cadeau* and the husband's financial support is not negligible. A 100,000 CFA franc's s higher *cadeau* (approximately 190 USD in 2005, about one standard deviation of the distribution of the *cadeau* amounts) increases the husband's financial support by nearly 5 percentage points, i.e., 10% of the mean. This is true even when controlling for a number of

[32] Considering relative food consumption, as shown in Table A.14 in the Appendix, we do not find any significant difference, which is linked to the fact that, as noted above, food consumption is rather equally shared within the household.

[33] Table A.10 in the Appendix presents the same descriptive statistics for the sample of coresiding women only. The results are similar.

Table 9
Coresidence and polygamy.
Source: PSF 2006.

	Coresidence with in-laws	Husband in polygynous union
Cadeau (in millions FCFA 2005)	−1.8166+	−2.9133
	(1.13)	(2.55)
Bride price (in millions FCFA 2005)	0.4956	−1.9422
	(0.72)	(2.21)
Bagage (in millions FCFA 2005)	4.5567***	2.6603
	(1.51)	(3.57)
Wife with some primary education	−0.2778	−1.6730***
	(0.26)	(0.62)
Wife with secondary or superior education	−0.4844	−0.6515
	(0.37)	(0.83)
Age of the wife at marriage	−0.0483***	0.0333
	(0.02)	(0.04)
Log of the expenditures of the hh pc	−0.4500***	−0.0836
	(0.17)	(0.45)
Wife lives in a rural place	0.1177	0.5977
	(0.32)	(0.50)
Constant	5.8853**	0.1801
	(2.40)	(6.10)
Region and time FE	Yes	Yes
Other Controls	Yes	Yes
Controls Husband	Yes	Yes
Controls Composition	Yes	Yes
Number of married women	802	470
Dep. var. Mean	0.36	0.07
St. dev.	0.48	0.25
R2	0.24	0.25
chi2	215.55	128.48

+ p < 0.11, *p < 0.10, **p < 0.05, ***p < 0.01.
Note: Logit estimates. Dependent variables: column (1): dummy equals to 1 if the woman co-resides with the father or the mother-in-law, column (2): dummy equals to 1 for women currently in a polygamous union while having originally married as a monogamous.
Marriage payments amounts are expressed in millions FCFA 2005. "Other Controls" include dummies for the occupation of the wife's father and for the wife's ethnic group. "Controls Husband" include the occupation of the husband. "Controls Composition" include the number of children and the number of adults in the household and in the cell, and, in column (1) only, whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling unit in parentheses.
Sample: Women who married between 1996 and 2006. For column (2), women who married between 1996 and 2006 and who are first wives, the husband being in a polygynous union or not.

variables that are likely to capture the husband's income (household per capita consumption, husband's occupation) and for any other significant correlates of the amount of the *cadeau*. The wealth of the husband's household of origin probably does not play a role in this result, as it would also generate a correlation with the bride price. Instead, this result suggests that this correlation is driven by unobserved characteristics that explain both the importance of the *cadeau* and the financial support provided by the husband to his wife. These unobservable variables could be linked to the specificity of the match between these two people, such as the wife's ex ante bargaining power or the love of her husband. The correlation between the husband's financial support and the *bagage* is also strong. This may not come as a surprise, since part of the *cadeau* can be used to finance the *bagage*. In any case, the correlation with the bride price is very weak and is not statistically significant.

The amount of the *cadeau* is correlated with a lower probability of coresidence with the wife's in-laws (p-value = 0.108, Table 9). It is not significantly (but rather negatively) correlated with the probability of the husband having taken a new wife since the marriage, thus becoming a polygamist. It should be noted that, on average, husbands take a second wife 10 years after their first marriage; therefore, the time interval we consider in this study may be too short to detect a significant correlation.[34] For the time interval to first birth, we use a Cox model, including an interaction between marriage payments and time (in years), since the proportional hazard assumption is not met (Table 10). A higher *cadeau* is associated with a longer delay between the time of the marriage and the first birth (since the hazard ratio is inferior to 1), implying lower fertility pressure. In the main sample, this is only suggestive, as the coefficient is not statistically different from 1 (p-value 0.13). Nevertheless, it is significantly different from 1 for the sub-sample of women in their first marriage, who are those most likely to be under pressure to give birth (see Table 12). This effect diminishes over time, as might be expected, since giving birth is part of marital obligations. The *bagage* is positively correlated with the probability of coresidence with the in-laws, which may reflect the fact that it plays a role in helping the newly-wed woman to assert her independence and status within her new household.

The conceptual framework presented above helps structure the interpretation of these results. The *cadeau* is a marriage payment for which the husband has some individual margin of manoeuvre, through which he can express the value he attaches to the union and commit to future good behavior. This translates into positive outcomes for the wife, with a greater access to household resources and better living arrangements. Given that we control for various observable variables in the above regressions, in particular household's per capita consumption, the findings suggest that unobservable variables, such as the husband's love for his wife, play a role in explaining both the level of the *cadeau* and the wife's future well-being. Conversely, the bride price appears to be strongly based on social norms and rather little on individual characteristics, and does not seem to correlate with the wife's bargaining power or welfare in her marital household. These results suggest that the *cadeau* is a more powerful predictor of the wife's position in her household than the bride price.

[34] The probability of polygamy is estimated for all women who married monogamously in the first place and hence were either still in a monogamous union or were the senior wife in polygamous unions at the time of the survey.

Table 10
Timing of first birth.
Source: PSF 2006.

	First birth
Cadeau (in millions FCFA 2005)	0.2388
	(0.23)
Bride price (in millions FCFA 2005)	0.5132
	(0.31)
Bagage (in millions FCFA 2005)	1.5059
	(1.03)
Gift * Time	1.0655**
	(0.03)
Bride Price * Time	1.0384**
	(0.02)
Bagage * Time	0.9806
	(0.02)
Wife with some primary education	1.2531*
	(0.15)
Wife with secondary or superior education	1.2093
	(0.19)
Age of the wife at marriage	0.9695***
	(0.01)
Log of the expenditures of the hh pc	0.7319***
	(0.06)
Wife lives in a rural place	0.7421**
	(0.09)
Region and time FE	Yes
Other Controls	Yes
Controls Husband	Yes
Controls Composition	Yes
Number of married women	1973
Dep. var. Mean	33.77
St. Dev.	24.48
R2	0.04
chi2	42614.04

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Cox estimates. Hazard ratios are displayed. Dependent variable: number of months between marriage and first birth. Marriage payments amounts are expressed in millions FCFA 2005. "Time" is the number of year since marriage. "Other Controls" include dummies for the occupation of the wife's father and for the wife's ethnic group. "Controls Husband" include the occupation of the husband. "Controls Composition" include whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling unit in parentheses.
Sample: Women who married between 1996 and 2006. The number of observations corresponds for each wife to all the years since marriage and before the first birth or until survey year if still childless.

7 Robustness to sample choice

The sample used in the main analysis includes all surveyed women whose marriage took place in the 10 years preceding the survey. We have chosen to restrict the analysis to this time span to limit recall difficulties. However, we can still perform the same analysis by extending the sample to women who were married earlier. Moreover, the women are very heterogeneous in terms of their marriage; for a number of them, the marriage we observed was not their first, and not all of the women co-reside with their husbands. These situations are not exogenous and may be associated with specific marriage payment patterns. We have therefore repeated the previous analysis, varying the sample used to check the robustness of the results obtained thus far. Tables 11 and 12 display the coefficients for the three types of marriage payments obtained when replicating the analysis on different subsamples for the various outcomes. The first column repeats the main results.

7.1 Selection on the year of marriage

We first extend the sample to include all the women who married in the fifteen years before the survey was conducted. The results are extremely consistent. As shown in the second column of Table 11, the *cadeau* is positively correlated with the wife's relative non-food consumption and with the husband's financial support for women who are heads of their cell and who are not located in the same cell as their husband. The results are also similar for the other outcomes, with the *cadeau* positively associated with favorable well-being outcomes, while the bride price is not (Table 12).

7.2 First marriages

For the main analysis of this paper, we focus on all marriages to avoid selection effects. Nevertheless, the analysis mixes two situations that can be very different, namely first marriages and subsequent marriages. In fact, second marriages are relatively frequent in Senegal, following widowhood or divorce, and women who remarry differ from women who are in their first marriages on a number of dimensions (see Table A.6 in the Appendix). In addition, first marriages are characterized by a greater involvement of both spouses' families in the union. We therefore expect these marriages to be associated with specific characteristics in terms of marriage payments.

As visible in Table A.3 in the Appendix, marriage payments are more often dispensed with in the event of re-marriage. Bride price and *bagage* in particular are much less frequent for re-marriages than for first marriages. By contrast, the occurrence of *cadeau* is only slightly decreased by the number of marriages.

The results on the correlation between marriage payments and the wife's well-being are presented for women in their first marriages in the third column of Tables 11 and 12. The correlation between *cadeau* and the relative non-food consumption of the wife is positive and significant in this sub-sample. The significance disappears when restricting the analysis to those who are registered in an independent cell.[35] The correlation between the *cadeau* and the husband's financial support remains significantly positive. For these women, *cadeau* is also significantly correlated with lower fertility pressure and the lower likelihood of co-residence with the in-laws.

7.3 Selection on residence status

We test whether the results obtained hold when we restrict the sample to women co-residing with their husbands. Non-co-residence occurs either very early in the marriage, before the newlyweds are allowed to settle together (i.e., when the bride price is fully paid and the husband has the means to provide housing to his wife), or later, when the husband commutes between his rural home and his urban job, maintaining a household in each location, or when the wife has obtained an independent dwelling (in particular when she joins a polygamous household). This set of women is likely to differ from the set of co-residing women. In fact, Table A.7 in the Appendix shows that non-co-residing women are older at the time of marriage, more likely to reside with one of their parents and more likely to be in a polygamous union.

In addition, the bride price and the *bagage* are more often exchanged when the wife is co-residing with her husband, as shown in Table A.4 in Appendix. This result is consistent with qualitative interviews, according to which one condition for the bride to rejoin the conjugal home is that all payments have been made. They are also higher in the case of co-residence. Interestingly, neither the occurrence nor the amount of the *cadeau* is significantly different according to co-residence status; this underlines that the logic explaining the amount of the *cadeau* is very different from that explaining the amount of the bride price.

[35] Women in their first marriages who are not heading an independent cell are mainly either recently married and still residing with their parents, or married to a man who himself is still a member of his parental household.

Table 11
Wives' welfare outcomes and marriage payments, using different samples — part 1.
Source: PSF 2006.

	All	Over 15 years	First marriages	Coresident
Relative consumption of the wife				
Cadeau (in millions FCFA 2005)	0.466***	0.416***	0.396**	0.296
	(0.16)	(0.14)	(0.16)	(0.23)
Bride price (in millions FCFA 2005)	0.129	0.168	0.103	0.101
	(0.13)	(0.11)	(0.14)	(0.18)
Bagage (in millions FCFA 2005)	−0.166	−0.189	−0.279	−0.195
	(0.20)	(0.17)	(0.20)	(0.26)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	1.04	0.98	1.05	1.03
N	809	1059	689	558
r2	0.24	0.21	0.24	0.30
Relative consumption of the wife, different cell				
Cadeau (in millions FCFA 2005)	0.209	0.232	0.116	−0.216
	(0.22)	(0.16)	(0.22)	(0.26)
Bride price (in millions FCFA 2005)	0.065	0.064	0.058	−0.103
	(0.15)	(0.12)	(0.17)	(0.21)
Bagage (in millions FCFA 2005)	−0.118	−0.023	−0.256	−0.167
	(0.26)	(0.20)	(0.27)	(0.30)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.98	0.92	1.00	0.93
N	503	707	402	330
r2	0.28	0.23	0.30	0.45
Share of the wife's cell expenditures financed by the husband				
Cadeau (in millions FCFA 2005)	0.505*	0.459*	0.477+	0.625**
	(0.28)	(0.27)	(0.30)	(0.29)
Bride price (in millions FCFA 2005)	0.063	−0.006	0.113	0.034
	(0.15)	(0.13)	(0.16)	(0.20)
Bagage (in millions FCFA 2005)	0.557**	0.384	0.670**	0.030
	(0.28)	(0.26)	(0.31)	(0.36)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.48	0.48	0.52	0.60
N	503	707	402	330
r2	0.22	0.19	0.18	0.25

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: *First panel*: OLS, dependent variable: the ratio of the wife's cell's non-food expenditure per equivalent adult to that of the rest of the household. *Second panel*: same as the first panel, but restricted to wives not recorded in the same cell as that of their husband. *Third panel*: OLS, dependent variable: share of wife's cell expenditures financed by the husband.
Marriage payment amounts are expressed in millions FCFA 2005. Controls: age and education of the wife, year of the marriage, occupation of the wife's father, wife's ethnic group, occupation of the husband, number of children (except in the last panel), number of adults in the household and in the cell, the logarithm of the household consumption per capita, and (except in the 5th panel) whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling cluster in parentheses.
Sample: Column (1): Women who married between 1996 and 2006. Column (2): Women who married between 1991 and 2006. Column (3): Women who married between 1996 and 2006 and were observed in their first marriage. Column (4): Women who married between 1996 and 2006 and who coreside with their husband. The second and third panels are estimated only for the wives not recorded in the same cell as their husband.

The results concerning the link between marriage payments and the wife's well-being are replicated for the sample of co-residing wives in the last column of Tables 11 and 12. They are qualitatively very similar to those obtained with the original sample. The *cadeau* is positively, though not significantly, related to the relative non-food consumption of the wife's cell (the correlation is nonetheless negative, though not significantly different from zero, if we consider only women who are not registered in the same cell as their husbands). The *cadeau* is also still positively and significantly correlated with the husband's financial support. Qualitatively, the coefficients of the marriage payments in the regressions describing the probability of co-residence with the in-laws and the fertility pressure are similar to those obtained in the main sample.

8 Conclusion

This paper analyzes the links between different types of marriage payments and the welfare of the wife in her marital household, as measured by her access to household resources, marital living arrangements, and the fertility pressure she faces. Using a dataset that uniquely records all the payments exchanged between families and future spouses at the time of marriage, we examine the various types of marriage payments made in Senegal and show clear differences in both the way they are determined and the way they correlate with married women's welfare.

We show that the *cadeau* received directly by the wife from her husband and the bride price paid to the bride's family differ from each other in that the former is quite individualized, while the amount of the bride price seems to respond to social norms that cannot easily be escaped. Our conceptual framework rationalizes how these differences translate into contrasting patterns of correlation with the wife's welfare; while there is a clear positive association between the *cadeau* the wife receives from her husband at marriage and our various measures of her current welfare, no such link can be found for the bride price.

Obviously, the amounts of marital payments are endogenous; specifically, regarding the *cadeau*, it seems that the unobserved source of endogeneity is positively correlated with both the size of the *cadeau*

Table 12
Wives' welfare outcomes and marriage payments, using different samples — part 2.
Source: PSF 2006.

	All	Over 15 years	First marriages	Coresident
Coresidence with in-laws				
Cadeau (in millions FCFA 2005)	−1.817+	−2.149*	−1.967*	−1.951+
	(1.13)	(1.17)	(1.16)	(1.24)
Bride price (in millions FCFA 2005)	0.496	0.358	0.386	0.027
	(0.72)	(0.69)	(0.73)	(0.91)
Bagage (in millions FCFA 2005)	4.557***	4.749***	4.061***	2.643
	(1.51)	(1.46)	(1.53)	(1.83)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.36	0.35	0.41	0.46
N	802	1052	683	551
r2_p	0.24	0.23	0.21	0.32
Polygamous household				
Cadeau (in millions FCFA 2005)	−2.913	−1.368	−2.686	−0.825
	(2.55)	(1.63)	(2.83)	(3.48)
Bride price (in millions FCFA 2005)	−1.942	−0.328	−1.342	−8.860
	(2.21)	(1.28)	(2.14)	(5.75)
Bagage (in millions FCFA 2005)	2.660	1.221	2.370	9.781***
	(3.57)	(2.36)	(3.46)	(3.72)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	0.07	0.10	0.06	0.07
N	470	733	433	355
r2_p	0.25	0.22	0.24	0.50
Hazard ratio first birth				
Cadeau (in millions FCFA 2005)	0.239	0.580	0.163*	0.181
	(0.23)	(0.39)	(0.16)	(0.20)
Gift * Time	1.066**	1.051***	1.068**	1.084***
	(0.03)	(0.02)	(0.03)	(0.03)
Bride price (in millions FCFA 2005)	0.513	0.827	0.834	0.400
	(0.31)	(0.46)	(0.52)	(0.29)
Bride Price * Time	1.038**	1.022	1.026	1.044**
	(0.02)	(0.02)	(0.02)	(0.02)
Bagage (in millions FCFA 2005)	1.506	1.028	2.344	1.695
	(1.03)	(0.76)	(1.63)	(1.45)
Bagage * Time	0.981	0.995	0.978	0.992
	(0.02)	(0.02)	(0.02)	(0.03)
Controls individual	Yes	Yes	Yes	Yes
Mean Dep. Var.	34.68	41.81	33.55	32.53
N	1990	3009	1628	1306
chi2	42,614.04	62,316.70	197.08	155.91

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: *First panel*: Logit, dependent variable: coresidence with the father or the mother-in-law. *Second panel*: Logit, dependent variable: probability of being in a polygynous union at the time of the survey while having married as monogamous. *Third panel*: Cox model estimates, dependent variable: number of months between the marriage and the first birth. Marriage payment amounts are expressed in millions FCFA 2005. Controls: age and education of the wife, year of the marriage, occupation of the wife's father, wife's ethnic group, occupation of the husband, number of children (except in the last panel), number of adults in the household and in the cell, the logarithm of the household consumption per capita, and (except in the 5th panel) whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling cluster in parentheses.
Sample: Column (1): Women who married between 1996 and 2006. Column (2): Women who married between 1991 and 2006. Column (3): Women who married between 1996 and 2006 and were observed in their first marriage. Column (4): Women who married between 1996 and 2006 and who coreside with their husband. The fifth panel is estimated only for women of the first rank, whether polygamous or monogamous.

Table A.1
Frequency of marriage payments.
Source: PSF 2006.

	Number	Percentage	Cumulated Percentage
All type of marriage payments	260	32.14	32.14
Bride Price and Bagage but No Cadeau	116	14.34	46.48
Cadeau and Bagage but No Bride-price	45	5.56	52.04
Cadeau and Bride Price but No Bagage	126	15.57	67.61
Only a Bride Price	155	19.16	86.77
Only a Cadeau	57	7.05	93.82
Only a Bagage	10	1.24	95.06
No marriage payment	40	4.94	100.00
Total	809	100.00	

Note: reading: line 1: in 32,14% of the cases, the marriage gave rise to all types of marriage payments.
Sample: Marriages having occurred between 1996 and 2006.

Table A.2
Correlation coefficients between the different marriage payments,.
Source: PSF 2006.

	Marriage payments		
	Bride-price (1000 FCFA 2005)	Cadeau (1000 FCFA 2005)	Bagage (1000 FCFA 2005)
Bride-price (1000 FCFA 2005)	1.00		
Cadeau (1000 FCFA 2005)	0.08**	1.00	
Bagage (1000 FCFA 2005)	0.25***	0.22***	1.00
Observations	809		

Note: Sample: Marriages from the 1996 to 2006.

Table A.3
Marriage payments according to the number of marriages.

Variables	First marriage	Not first marriage	Diff.
Positive bride-price	0.85	0.61	0.24*** (0.00)
Positive *Cadeau*	0.62	0.53	0.09* (0.06)
Positive *Bagage*	0.56	0.37	0.20*** (0.00)
Bride price (1000 FCFA 2005), if positive	142.40	75.96	66.44*** (0.00)
Cadeau (1000 FCFA 2005), if positive	110.23	54.70	55.53*** (0.00)
Bagage (1000 FCFA 2005), if positive	91.64	73.90	17.74 (0.17)
Number of married women	689	120	809

Note: Sample: Marriages between 1996 and 2006.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.4
Marriage payments according to the status of residence.

Variables	Coresiding	Non coresiding	Diff.
Positive bride-price	0.86	0.71	0.14*** (0.00)
Positive *Cadeau*	0.62	0.57	0.05 (0.19)
Positive *Bagage*	0.62	0.34	0.28*** (0.00)
Bride price (1000 FCFA 2005), if positive	136.61	130.74	5.87 (0.61)
Cadeau (1000 FCFA 2005), if positive	100.84	108.43	−7.59 (0.45)
Bagage (1000 FCFA 2005), if positive	86.59	102.81	−16.22 (0.10)
Number of married women	558	251	809

Note: Sample: Marriages between 1996 and 2006.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.5
Sample description.
Source: Source: PSF 2006.

Women married in the last 10 years	All	809
	Coresiding	558
	Cell's head	503
Women married in the last 15 years	All	1059
	Cell's head	720
First marriages in the last 10 years	All	689
	Cell's head	411

Note: This table presents the number of observations for each sub-sample.

and the woman's welfare in the household. Guided by our conceptual framework, we interpret this relationship as being mainly due to the strength of the husband's amity or love for his wife: a loving husband gives a higher cadeau and provides better financial support and living conditions than an indifferent husband. This love the husband has for his wife is not observed directly but is in part captured by the cadeau.

Overall, in the context studied in this paper, the *cadeau* is likely to be a better proxy of the wife's bargaining power and of her marital welfare than the bride price because it better reflects the quality of the relationship between spouses.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix

See Tables A.1–A.14.

Table A.6
Characteristics of the wives according to the number of marriages.

Variables	First marriage	Not first marriage	Diff.
Household head's wife	0.38	0.42	−0.04
	[0.49]	[0.50]	(0.41)
Wife with some primary education	0.22	0.24	−0.02
	[0.42]	[0.43]	(0.64)
Wife with secondary or superior education	0.13	0.07	0.07**
	[0.34]	[0.25]	(0.04)
Age of the wife at marriage	20.38	34.38	−14.01***
	[6.00]	[11.88]	(0.00)
Age difference between spouses	11.25	13.16	−1.91**
	[7.53]	[9.30]	(0.02)
Log of the expenditures of the hh pc	12.31	12.33	−0.02
	[0.77]	[0.84]	(0.83)
Wife lives in a rural place	0.52	0.49	0.02
	[0.50]	[0.50]	(0.63)
In a monogamous union	0.80	0.44	0.36***
	[0.40]	[0.50]	(0.00)
In a polygamous union, first rank	0.04	0.04	−0.00
	[0.19]	[0.20]	(0.90)
In a poly. union, sec. or further rank	0.15	0.52	−0.36***
	[0.36]	[0.50]	(0.00)
Relative non food consumption of the wife	1.05	0.93	0.13**
	[0.57]	[0.45]	(0.02)
Share of the wife's cell expenditure financed by the husband	0.61	0.34	0.27***
	[0.45]	[0.41]	(0.00)
Presence of in-laws	0.41	0.08	0.32***
	[0.49]	[0.28]	(0.00)
Polygamous husband	0.20	0.56	−0.36***
	[0.40]	[0.50]	(0.00)
Number of months between marriage and first birth	25.63	33.46	−7.82***
	[25.05]	[31.65]	(0.00)
Number of married women	689	120	809

Note: Sample: Marriages between 1996 and 2006.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.7
Characteristics of the wives according to the coresidency status.

Variables	Coresiding	Non coresiding	Diff.
Wife with some primary education	0.22	0.25	−0.03
	[0.41]	[0.43]	(0.31)
Wife with secondary or superior education	0.11	0.16	−0.05*
	[0.31]	[0.36]	(0.07)
Age of the wife at marriage	21.00	25.69	−4.69***
	[6.72]	[11.44]	(0.00)
Coresides with at least one parent	0.05	0.39	−0.33***
	[0.22]	[0.49]	(0.00)
Age difference between spouses	11.60	11.25	0.35
	[7.74]	[8.20]	(0.64)
Log of the expenditures of the hh pc	12.33	12.28	0.04
	[0.78]	[0.77]	(0.45)
Wife lives in a rural place	0.51	0.51	0.01
	[0.50]	[0.50]	(0.83)
In a monogamous union	0.77	0.71	0.07**
	[0.42]	[0.46]	(0.05)
In a polygamous union, first rank	0.05	0.02	0.02
	[0.21]	[0.15]	(0.13)
In a poly. union, sec. or further rank	0.18	0.26	−0.08***
	[0.39]	[0.44]	(0.01)
Relative non food consumption of the wife	1.03	1.06	−0.03
	[0.56]	[0.54]	(0.45)
Share of the wife's cell expenditure financed by the husband	0.66	0.28	0.38***
	[0.44]	[0.40]	(0.00)
Presence of in-laws	0.46	0.14	0.32***
	[0.50]	[0.35]	(0.00)
Polygamous husband	0.23	0.29	−0.07**
	[0.42]	[0.46]	(0.05)
Number of months between marriage and first birth	25.56	29.77	−4.21**
	[23.95]	[30.90]	(0.04)
Number of married women	558	251	809

Note: Sample: Marriages between 1996 and 2006.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.8
Married women's characteristics (marriages between 1991 and 2006).
Source: PSF 2006.

	N	Mean	SD
Wife with some primary education	1059	0.22	0.41
Wife with secondary or superior education	1059	0.11	0.31
Age of the wife at marriage	1059	22.06	8.48
Age Difference between spouses	926	11.63	7.82
Log of the expenditures of the hh pc	1059	12.29	0.76
Wife lives in a rural place	1059	0.52	0.50
In a monogamous union	1059	0.73	0.45
In a polygamous union, first rank	1059	0.07	0.26
In a poly. union, sec. or further rank	1059	0.20	0.40
Relative non food consumption of the wife	1059	0.98	0.52
Share of the wife's cell expenditure financed by the husband	977	0.54	0.44
Presence of in-laws	1052	0.35	0.48
Polygamous husband	1059	0.27	0.45
Number of months between marriage and first birth	981	30.53	32.06

Note: Sample: Marriages from 1991 to 2006. The information on husband's age is missing for some non-coresiding women, thus the missing observations for the age gap. The share of the wife's cell expenditures financed by the husband is only computed for women who are heading a cell. Number of months between marriage and first birth can only be computed when marriage date is precise enough. In a number of cases, only the year of marriage was provided.

Table A.9
Characteristics of the wives according to whether they are recorded in the same cell than their husband or not.

Variables	Different cell	Same cell	Diff.
Household head's wife	0.61	0.01	−0.60***
	[0.49]	[0.11]	(0.00)
Wife with some primary education	0.22	0.24	0.02
	[0.41]	[0.42]	(0.58)
Wife with secondary or superior education	0.13	0.12	−0.01
	[0.33]	[0.32]	(0.69)
Age of the wife at marriage	23.19	21.25	−1.94***
	[8.94]	[8.26]	(0.00)
Age Difference between spouses	13.08	9.01	−4.07***
	[8.56]	[5.63]	(0.00)
Log of the expenditures of the hh pc	12.40	12.17	−0.23***
	[0.79]	[0.75]	(0.00)
Wife lives in a rural place	0.52	0.49	−0.03
	[0.50]	[0.50]	(0.42)
In a monogamous union	0.64	0.93	0.29***
	[0.48]	[0.26]	(0.00)
In a polygamous union, first rank	0.06	0.00	−0.06***
	[0.24]	[0.06]	(0.00)
In a poly. union, sec. or further rank	0.29	0.07	−0.23***
	[0.46]	[0.25]	(0.00)
Relative non food consumption of the wife	0.98	1.12	0.14***
	[0.53]	[0.58]	(0.00)
Share of the wife's cell expenditure financed by the husband	0.50	0.72	0.22***
	[0.44]	[0.46]	(0.00)
Presence of in-laws	0.24	0.55	0.31***
	[0.43]	[0.50]	(0.00)
Polygamous husband	0.36	0.07	−0.29***
	[0.48]	[0.26]	(0.00)
Number of months between marriage and first birth	27.54	25.63	−1.91
	[27.52]	[24.08]	(0.33)
Number of married women	503	306	809

Note: Sample: Marriages between 1996 and 2006.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.10
Difference in characteristics according to whether the wife is recorded in the same cell than her husband or not - Coresiding wives.

Variables	Different cell	Same cell	Diff.
Household head's wife	0.93	0.02	−0.91***
	[0.26]	[0.13]	(0.00)
Wife with some primary education	0.21	0.23	0.02
	[0.41]	[0.42]	(0.53)
Wife with secondary or superior education	0.11	0.11	0.01
	[0.31]	[0.32]	(0.77)
Age of the wife at marriage	21.84	19.78	−2.06***
	[7.34]	[5.49]	(0.00)
Age Difference between spouses	13.58	8.73	−4.85***
	[8.50]	[5.34]	(0.00)
Log of the expenditures of the hh pc	12.42	12.20	−0.22***
	[0.78]	[0.77]	(0.00)
Wife lives in a rural place	0.54	0.47	−0.07
	[0.50]	[0.50]	(0.11)
In a monogamous union	0.63	0.97	0.34***
	[0.48]	[0.16]	(0.00)
In a polygamous union, first rank	0.08	0.00	−0.08***
	[0.27]	[0.00]	(0.00)
In a poly. union, sec. or further rank	0.29	0.03	−0.26***
	[0.45]	[0.16]	(0.00)
Relative non food consumption of the wife	0.93	1.16	0.23***
	[0.51]	[0.61]	(0.00)
Share of the wife's cell expenditure financed by the husband	0.61	0.72	0.11***
	[0.42]	[0.46]	(0.00)
Presence of in-laws	0.29	0.70	0.41***
	[0.46]	[0.46]	(0.00)
Polygamous husband	0.37	0.03	−0.34***
	[0.48]	[0.16]	(0.00)
Number of months between marriage and first birth	26.94	23.44	−3.51*
	[24.87]	[22.35]	(0.10)
Number of married women	330	228	558

Note: Sample: Women who married between 1996 and 2006 and who reside with their husband.
Standard deviations are in brackets, P-values are in parentheses and significance levels are denoted as follows: *p < 0.10, **p < 0.05, ***p < 0.01.

Table A.11
Marriage payments, Coresiding wives.
Source: PSF 2006.

Contribution	Bride price		Cadeau		Bagage	
	Existence	Amount	Existence	Amount	Existence	Amount
Women-to-men ratio in the department	−0.35**	−161.35***	0.20	32.27	0.10	7.67
	(0.17)	(58.10)	(0.17)	(60.65)	(0.17)	(39.60)
Average of the logarithm of the hh consumption per cap by department	0.21**	48.08	−0.09	−23.27	0.06	25.99
	(0.10)	(38.54)	(0.10)	(30.60)	(0.13)	(43.41)
Wife is wolof	−0.02	14.22	0.03	12.73	0.07	13.67
	(0.04)	(18.58)	(0.05)	(15.51)	(0.06)	(14.50)
Wife is poular	−0.03	0.89	0.11*	35.40*	0.01	−9.76
	(0.05)	(19.60)	(0.06)	(18.05)	(0.05)	(14.77)
Characteristics of the Match						
Same ethnic group, different family	0.01	25.58	−0.18***	−68.40***	−0.08	−29.58
	(0.05)	(19.66)	(0.07)	(19.45)	(0.07)	(18.78)
Same ethnic group, same family	0.03	17.96	−0.11*	−53.49***	−0.11	−30.73*
	(0.05)	(19.92)	(0.07)	(20.16)	(0.07)	(16.68)
Fathers with same professional status	−0.00	22.05	0.01	−3.68	0.06	4.44
	(0.03)	(14.25)	(0.04)	(11.69)	(0.04)	(10.35)
Fathers's professional status unknown	0.06	45.85	−0.25**	−40.67	0.15	21.51
	(0.10)	(36.11)	(0.11)	(46.40)	(0.10)	(23.92)
Characteristics of the Families						
Number of siblings of the wife alive	−0.01	0.15	0.01*	1.98	0.00	0.15
	(0.01)	(2.87)	(0.01)	(2.12)	(0.01)	(1.57)
Number of siblings of the husband alive	0.00	4.10*	0.02**	5.58***	0.01	4.51*
	(0.00)	(2.35)	(0.01)	(1.96)	(0.01)	(2.40)
Parents of the wife alive at marriage	0.06	56.33**	0.03	−6.27	−0.05	−16.80
	(0.06)	(23.13)	(0.10)	(30.37)	(0.10)	(25.69)
Characteristics of the Wife						
Education (*ref. no education*)						
..... Primary	−0.00	15.47	0.11	33.40**	0.02	13.47
	(0.03)	(15.80)	(0.07)	(16.35)	(0.06)	(15.48)
..... Secondary	0.07	105.81***	0.05	40.52*	0.03	38.57
	(0.06)	(21.28)	(0.07)	(23.36)	(0.07)	(24.58)
Age of the wife at marriage	−0.00	−3.46***	−0.00	−2.67***	−0.00	−1.16
	(0.00)	(0.90)	(0.00)	(1.00)	(0.00)	(0.86)
Wife lives in a rural place	−0.03	−15.90	−0.03	−4.80	0.01	12.84
	(0.05)	(19.32)	(0.05)	(15.32)	(0.08)	(19.69)
Characteristics of the Husband						
Professional status (*ref. independent/informal employee*)						
..... Farmer	−0.02	30.18*	0.16**	59.33***	0.14*	14.67
	(0.06)	(15.58)	(0.07)	(17.56)	(0.07)	(14.22)
..... State employed/employer	−0.05	15.85	0.08	38.23**	0.02	7.77
	(0.04)	(20.13)	(0.06)	(18.29)	(0.05)	(16.13)
..... Other	−0.06	25.63	−0.01	10.94	0.01	−0.88
	(0.06)	(22.54)	(0.09)	(19.05)	(0.08)	(16.70)
Husband has been to coranic school	−0.02	10.95	0.06	29.43**	0.09*	20.54*
	(0.04)	(12.41)	(0.05)	(13.56)	(0.05)	(11.86)
Husb. worked at time of marriage	0.07	−6.32	0.16	77.45**	0.23**	77.49**
	(0.08)	(39.02)	(0.11)	(30.78)	(0.11)	(33.37)
Constant		−348.69		239.37		−370.95
		(493.97)		(403.01)		(553.21)
sigma		131.45***		112.79***		101.49***
		(7.60)		(6.71)		(8.85)
Region and marriage year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pval_region+marriage year	0.00	0.00	0.00	0.00	0.00	0.02
N	548	558	558	558	554	558
Dep. Var. mean	1.00	117.03	1.00	62.35	1.00	53.54
st. dev	0.00	128.53	0.00	87.44	0.00	75.33
Pseudo-R2		0.02		0.02		0.02

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Odd columns: Average marginal effect of Logit estimates, Dependent variables: occurrence of marriage payment, standard errors clustered at the level of the sampling cluster in parentheses. Even columns: Tobit estimates, Dependent variables: amount of marriage payment expressed in 1000 CFA 2005, standard errors clustered at the level of the sampling unit in parentheses.
Omitted occupation category for the husband: independent or informal employee. For occupation dummies "inactive" and "unknown", coefficients (not displayed here) are never significant. Same holds for the dummies "unknown" for the endogamy variables. Categories of occupation for the wife's father are included in the specification but are not displayed here because they are never significant.
Sample: Women who married between 1996 and 2006 and who co-reside with their husband.

Table A.12
Marriage transfers, All marriages (1991–2006).
Source: PSF 2006.

Contribution	Bride price		Cadeau		Bagage	
	Existence	Amount	Existence	Amount	Existence	Amount
Women-to-men ratio in the department	−0.13	−69.69	0.20	−17.20	0.16	17.26
	(0.14)	(46.07)	(0.13)	(49.39)	(0.14)	(32.51)
Average of the logarithm of the hh consumption per cap by department	0.22***	82.24**	−0.14	−21.54	0.11	36.00
	(0.08)	(32.20)	(0.09)	(28.01)	(0.11)	(36.52)
Wife is wolof	−0.01	10.78	0.01	−6.28	0.03	−3.50
	(0.03)	(13.76)	(0.04)	(12.44)	(0.05)	(12.66)
Wife is poular	−0.01	6.07	0.04	12.31	0.07	2.56
	(0.04)	(15.40)	(0.04)	(14.39)	(0.05)	(13.67)
Characteristics of the Match						
Same ethnic group, different family	−0.03	13.18	−0.17***	−50.36***	−0.10*	−16.90
	(0.04)	(15.59)	(0.04)	(13.25)	(0.05)	(15.18)
Same ethnic group, same family	0.00	8.81	−0.07	−27.75**	−0.03	−9.00
	(0.04)	(15.08)	(0.05)	(12.94)	(0.05)	(13.07)
Characteristics of the Families						
Number of siblings of the wife alive	−0.00	1.26	0.01*	2.79	0.01**	2.07
	(0.00)	(2.24)	(0.01)	(1.73)	(0.01)	(1.28)
Parents of the wife alive at marriage	0.03	41.63**	−0.04	−11.49	0.04	9.94
	(0.05)	(17.20)	(0.07)	(20.21)	(0.06)	(17.70)
Characteristics of the Wife						
Education (*ref. no education*)						
..... Primary	−0.02	20.95	0.12***	40.13***	0.07*	20.18*
	(0.03)	(13.08)	(0.04)	(11.90)	(0.04)	(10.62)
..... Secondary	0.03	98.76***	0.10*	58.55***	0.12**	49.35***
	(0.04)	(18.15)	(0.06)	(17.35)	(0.06)	(18.33)
Age of the wife at marriage	−0.01***	−3.82***	−0.00	−1.85***	−0.01***	−2.13***
	(0.00)	(0.67)	(0.00)	(0.70)	(0.00)	(0.59)
Wife lives in a rural place	0.04	13.74	−0.00	10.31	0.07	20.52
	(0.04)	(15.02)	(0.04)	(12.70)	(0.06)	(14.97)
Characteristics of the Husband						
Professional status (*ref. independent/informal employee*)						
..... Farmer	−0.01	8.99	0.04	23.87*	−0.03	−13.73
	(0.04)	(12.09)	(0.05)	(14.24)	(0.05)	(11.35)
..... State employed/employer	0.03	29.69**	0.05	27.06**	0.03	9.88
	(0.03)	(14.58)	(0.05)	(13.33)	(0.04)	(11.80)
..... Other	−0.02	21.03	−0.03	−4.93	0.01	0.94
	(0.05)	(16.28)	(0.08)	(16.84)	(0.07)	(13.97)
Constant		−830.66**		385.45		−437.96
		(421.34)		(364.00)		(470.39)
sigma		138.76***		119.90***		107.81***
		(7.02)		(6.36)		(7.19)
Region and marriage year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pval_region+marriage year	0.00	0.00	0.00	0.00	0.00	0.00
N	1059	1059	1059	1059	1059	1059
Dep. Var. mean	1.00	113.09	1.00	62.87	1.00	50.77
st. dev	0.00	129.97	0.00	91.38	0.00	73.20
Pseudo-R2		0.02		0.02		0.02

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Odd columns: Average marginal effect of Logit estimates, Dependent variables: occurrence of marriage payment, standard errors clustered at the level of the sampling cluster in parentheses. Even columns: Tobit estimates, Dependent variables: amount of marriage payment expressed in 1000 CFA 2005, standard errors clustered at the level of the sampling cluster in parentheses.
Omitted occupation category for the husband: independent or informal employee. For occupation dummies "inactive" and "unknown", coefficients (not displayed here) are never significant. Same holds for the dummies "unknown" for the endogamy variables. Categories of occupation for the wife's father are included in the specification but are not displayed here because they are never significant.
Sample: Women who married between 1991 and 2006.

Table A.13
Age of marriage and marriage payments, All marriages, including rainfall shocks as an explanatory variable.

	Existence of a bride price	Amount of bride price	Existence of a gift	Amount of gift	Age at marriage
Negative shock at 16, 17 or 18 years old	−0.0668*	−14.6062	−0.0098	−18.6158	4.9545***
	(0.03)	(13.89)	(0.04)	(14.52)	(0.51)
Positive shock at 16, 17 or 18 years old	−0.0216	−3.8938	−0.0144	−4.4672	−0.9536**
	(0.03)	(12.54)	(0.04)	(10.93)	(0.46)
Women-to-men ratio in the department	−0.1346	−67.3013	0.1166	−22.5984	−0.3911
	(0.18)	(53.40)	(0.15)	(59.90)	(1.85)
Average of the logarithm of the hh consumption per cap by department	0.2005**	82.0654**	−0.1143	−6.5438	−0.5863
	(0.10)	(38.71)	(0.09)	(29.93)	(1.03)
Wife is wolof	0.0106	25.0267	0.0100	−4.7085	0.2391
	(0.04)	(17.15)	(0.05)	(14.98)	(0.43)
Wife is poular	−0.0054	10.1541	0.0376	10.9017	−0.5012
	(0.05)	(18.49)	(0.05)	(17.97)	(0.50)
Characteristics of the Match					
Same ethnic group, different family	−0.0255	9.5470	−0.1974***	−66.2236***	0.6770
	(0.05)	(19.61)	(0.05)	(16.51)	(0.56)
Same ethnic group, same family	0.0201	15.7941	−0.0935*	−39.0734**	−0.1088
	(0.04)	(18.42)	(0.05)	(16.39)	(0.58)
Characteristics of the Families					
Number of siblings of the wife alive	−0.0027	2.8348	0.0152**	2.4413	−0.0192
	(0.01)	(2.64)	(0.01)	(2.08)	(0.07)
Parents of the wife alive at marriage	0.0542	40.7625*	−0.0845	−19.6791	−4.2796***
	(0.06)	(22.07)	(0.10)	(28.43)	(1.22)
Characteristics of the Wife					
Education (*ref. no education*)					
..... Primary	−0.0370	22.2636	0.1536***	54.7181***	0.2728
	(0.03)	(15.44)	(0.05)	(15.04)	(0.46)
..... Secondary	0.0385	114.8725***	0.1041	67.8898***	0.9156
	(0.04)	(19.66)	(0.07)	(21.62)	(0.65)
Wife lives in a rural place	0.0515	19.9225	0.0769*	35.3562**	−1.6844***
	(0.04)	(16.16)	(0.04)	(14.56)	(0.49)
Characteristics of the Husband					
Professional status (*ref. independent/informal employee*)					
..... Farmer	−0.0481	5.9043	0.1211**	45.1707***	−0.2312
	(0.05)	(14.65)	(0.06)	(17.18)	(0.45)
..... State employed/employer	0.0069	22.7914	0.0834	39.9582**	0.5349
	(0.04)	(17.20)	(0.06)	(16.68)	(0.54)
..... Other	−0.0220	30.0120	−0.0104	9.8382	0.1593
	(0.05)	(21.41)	(0.09)	(21.54)	(0.62)
Constant		−949.2329*		175.6828	31.6264**
		(505.57)		(397.58)	(13.06)
sigma		141.8607***		122.7695***	
		(8.01)		(6.82)	
Region and marriage year FE	Yes	Yes	Yes	Yes	Yes
N	745	745	745	745	745
Dep. Var. mean	1.00	117.00	1.00	65.05	20.65
st. dev	0.00	133.32	0.00	94.43	5.53
R2					0.37
Pseudo-R2		0.01		0.02	

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: Even columns: Average marginal effect of Logit estimates, Dependent variables: occurrence of marriage payment, standard errors clustered at the level of the sampling cluster in parentheses. Odd columns: Tobit estimates, Dependent variables: amount of marriage payment expressed in 1000 CFA 2005, standard errors clustered at the level of the sampling unit in parentheses.
Omitted occupation category for the husband: independent or informal employee. For occupation dummies "inactive" and "unknown", coefficients (not displayed here) are never significant. Same holds for the dummies "unknown" for the endogamy variables. Additional control: occupation of the wife's father.
Sample: Women born after 1966 and who married between 1996 and 2006.

Table A.14
Wife's access to household food consumption.

	Relative food consumption of the wife	
	All women	Women not in their husband's cell
Cadeau (in millions FCFA 2005)	0.0098	−0.0192
	(0.04)	(0.06)
Bride price (in millions FCFA 2005)	−0.0429	−0.0648
	(0.05)	(0.08)
Bagage (in millions FCFA 2005)	0.0489	0.0414
	(0.05)	(0.06)
Wife with some primary education	−0.0132	−0.0222
	(0.01)	(0.02)
Wife with secondary or superior education	0.0179	0.0257
	(0.02)	(0.02)
Age of the wife at marriage	0.0001	−0.0009
	(0.00)	(0.00)
Log of the expenditures of the hh pc	−0.0026	−0.0071
	(0.01)	(0.01)
Wife lives in a rural place	−0.0061	0.0087
	(0.01)	(0.01)
Constant	1.0388***	1.0914***
	(0.11)	(0.15)
Region and time FE	Yes	Yes
Other Controls	Yes	Yes
Controls Husband	Yes	Yes
Controls Composition	Yes	Yes
Number of married women	807	502
Dep. var. Mean	0.99	0.98
St. Dev.	0.11	0.12
R2	0.06	0.11

*p < 0.10, **p < 0.05, ***p < 0.01.
Note: OLS estimates. Dependent variable: ratio of the wife's cell per capita food expenditure to that of the household. Marriage payments amounts are expressed in millions FCFA 2005. "Other Controls Wife" includes dummies for the occupation of the wife's father and for the wife's ethnic group. "Controls Husband" includes the occupation of the husband. "Controls Composition" includes the number of children and the number of adults in the household and in the cell and whether the wife lives in a monogamous union, is the first wife of a polygamous husband, or is of a higher rank. Standard errors clustered at the level of the sampling cluster in parentheses.
Sample: First column: all women married between 1996 and 2006. Second column: Sub-sample of those who are their cell's head and not in the cell of their husband.

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