Sex ratios and racial differences in marriage rates in South Africa

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Abstract

In South Africa, marriage rates among white women aged 20 to 34 are at least twice as high as marriage rates among African women in the same age cohort. This paper compares the relationship between alternative definitions of sex ratios and marriage outcomes among African and white women using matched data from the 2001 Population Census and the South African Labour Force Surveys. We show that among both white and African women, simple sex ratios, which capture the quantity of unmarried men relative to women in local marriage markets, are significant predictors of marriage. However, among African women, economic-based measures of "marriageability", which take into account the quality of available men, perform even better in predicting marriage. Our findings are consistent with the argument that the payment of bridewealth (or *ilobolo*) by a husband to the prospective wife's family acts as a financial constraint to marriage among African couples, raising the "marriageability" criteria of men.

1 Introduction

Marriage rates in South Africa are significantly lower among African[1] women than among white women. In 2003, for example, white women aged 20 to 34 were more than twice as likely as African women in the same age cohort to be married. Large racial differences in marriage rates also have been documented for the United States. A key hypothesis that has been tested in this literature is that these differences in marriage rates reflect differences in the pools of "marriageable" men, where following Wilson (1987), "marriageability" is identified not only by the marital status of men but also by their economic status (cf. Wood 1995, Brien 1997, Angrist 2000).

South Africa offers a particularly interesting opportunity to explore the relationship between marriage markets and marriage outcomes. First, significant racial disparities in labour market opportunities persist in post-apartheid South Africa - unemployment rates are markedly higher among African men than among white men, and earnings remain significantly lower. Racial differences in sex ratios which incorporate the economic status of men are therefore far more pronounced than differences in simple sex ratios. Second, in many African marriages, bridewealth (or *ilobolo*) is paid by the prospective husband to his wife's family to validate the marriage. This payment, which is considerably larger than the mean monthly earnings of African men (Casale and Posel 2009), suggests that economic status may be particularly important in identifying the marriageable pool of African men. It is plausible therefore that low marriage rates among African women reflect not so much a shortage of available (unmarried) African men, but a shortage of "marriageable" men.

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[1]The term African is used to describe black South Africans who make up the majority of the population (approximately eighty percent).

In this paper, we investigate the large racial differences in marriage rates in South Africa. In particular, we test whether economic-based measures of "marriageability", which take into account the quality of available men, perform better in predicting marriage than simple sex ratios, which capture only the quantity of unmarried men relative to women in local marriage markets. Alternative measures of sex ratios, which differ according to how the marriageable pool of men is identified, are generated using the 2001 Population Census (the most recently released census in South Africa). To approximate the local marriage market better, sex ratios are estimated at the district level and these district sex ratios are then matched to the 2003 Labour Force Survey (LFS). We use the matched data on the samples of young African and white women to run both individual-level regressions, which estimate the probability of marriage, and district-level regressions, which estimate the average relationship between district sex ratios and district marriage rates.

Our estimations show that the probability of marriage among young African women is positively and significantly related to the local pool of unmarried African men, but that the effect is strongest where these men are employed and earning incomes above a certain threshold. Consistent with the view that *ilobolo* raises the "marriageability" criteria we find that these results are even stronger in the province of KwaZulu-Natal, which contains the largest Zulu-speaking population in the country, and where the practice of paying bridewealth is most common. In contrast, there is only weak evidence to link the "marriageability" of white men according to their economic status to the probability of marriage among young white women. Estimations at the district level produce consistent results for Africans, but small and insignificant coefficients for whites, partly because of sample size restrictions at the district level.

We test the robustness of our findings to different samples, specifications and data. The study looks specifically at a cohort of young women aged 20 to 34, and a corresponding cohort of men aged 23 to 37. However, we show that our results remain robust for an extended age cohort of women aged 20 to 39 (and men aged 23 to 42). Our findings are robust also to controls for possible migration effects and to alternative measures of the economic status of men. By matching 2001 Census data on sex ratios to 2003 LFS data, we have assumed a two-year lag between the pool of marriageable men relative to women and marriage-market outcomes. However the estimates remain consistent, particularly for Africans, when the 2001 district sex ratios are matched to 2002 LFS data and 2004 LFS data.

In the next section, we review the literature on sex ratios and marriage rates, and we outline specific characteristics of marriage markets and labour markets in South Africa. Section 3 describes the data and methods used in the study and in Section 4, the main estimations using the 2003 LFS data are presented. In Section 5, we report on a range of sensitivity tests undertaken and in the last section we summarise the key empirical findings of the study.

2 Literature review: Marriage rates and sex ratios

In standard economic theory, the event of marriage has been explained as a match in the marriage market between prospective partners, where for both partners the utility of being married outweighs the utility of remaining single, and the gains from marriage are typically understood as deriving from the specialisation of labour within the household (Becker 1973; 1981). In the context of incomplete information in the marriage market, individuals engage in a costly search process to find a suitable marriage partner, conceptually similar to the job search process in the labour market (Lichter *et al* 1992; Wood 1995; Brien and Sheran 2003).

One of the factors affecting the probability of marriage is the availability of potential marriage partners with suitable characteristics in local marriage markets (Lichter *et al* 1992; Wood 1995). A large supply of suitable potential spouses will reduce the cost of search for a marriage partner and increase the potential benefits from marriage. For each individual, the suitability or "marriageability" of potential partners is judged against what has been referred to as the "reservation quality

partner" (Lichter *et al* 1992), a partner that has some minimum level of characteristics without which the marriage offer will not be accepted.

In addition to certain demographic characteristics such as age and race, the economic attractiveness of potential male partners is one of the qualities commonly assumed to determine the reservation partner for women. Women may only consider marrying men who have achieved a "minimum acceptable level of current labo[u]r market success" (Wood 1995: 165), as this success provides some indication of a man's future earnings potential. This means that a woman's reservation offer in the marriage market may be sticky downwards – even if marriage markets do not clear, women will not accept marriage offers from men who do not meet some minimum criterion.

This idea was embodied in Wilson's (1987) "male marriageable pool" hypothesis, that the large decline in marriage rates among African Americans in the United States was being driven by the deterioration in economic circumstances among this group of men, and consequently a shrinking supply of marriageable young men available for young African American women (in contrast to their white counterparts) (see also Charles and Luoh 2005). Wilson (1987) defined "marriageability" in terms of the employment status of available men (relative to available women) but other studies have subsequently investigated the concept of "marriageability" in more depth to include the quality of employment or some minimum level of earnings (Lichter *et al* 1992; Wood 1995; Brien 1997).

The empirical evidence from this literature is mixed. The results suggest that measures of economic attractiveness of potential male partners (and particularly income-based measures) are strong predictors of marriage among African Americans, but not among whites. However, the declining "marriageability" of African American men seems to be responsible for only a small portion of the decline in marriage rates over time, once other factors have been controlled for.

In South Africa, the large racial differences in marriage rates typically have been explained by the ravaging effects of apartheid policies, which impinged on almost every aspect of the social, political and economic life of Africans. Studies on family formation in South Africa have pointed to the devastating impact of restrictions on the free movement of Africans, where the majority of the population was forced into crowded homeland areas and movement to urban areas to work was strictly regulated (see Hosegood *et al* 2009 for a comprehensive review). Men predominantly migrated for periods of work, while women remained in rural areas with children, creating both emotional and financial instability within marriage. Hosegood *et al*, 2009 also highlight the negative effect that this had on attitudes towards the institution of marriage, reinforced by the general acceptance of non-marital childbearing among Africans.

Although geographic restrictions on permanent residence were dismantled in the late 1980s, marriage rates remain low and have continued to decline in the post-apartheid era, particularly among Africans. In this study we seek to add to the literature by exploring whether economic conditions can be linked to marriage rates in South Africa. Due to discriminatory practices in the South African labour market during the decades of apartheid, reinforced by lacklustre employment growth in the post-apartheid period (cf. Casale *et al* 2004; Bhorat 2006), African men are much more likely to be unemployed. Among the employed, African men are far less likely to work in stable, high-earning jobs, than white men. Data from the 2001 Population Census suggest that among young African men, unemployment rates are 10 times larger than among young white men, and that on average they earn only a quarter of what white men earn. The pool of marriageable men available to young African women therefore is considerably smaller than for white women. In terms of the theoretical framework presented above, a large imbalance between the demand for and supply of marriageable men means that some proportion of women participating in the marriage market will not get married. We would therefore expect the availability of marriageable men, defined in terms of their economic performance, to be an important reason why marriage rates are far lower among African women than among white women.

An additional reason why we would expect economic status to influence the "marriageability" particularly of African men, concerns the traditional practice of *ilobolo*, the payment of bridewealth by the prospective groom to the bride's family to validate the marriage. The limited quantitative

data that exist on *ilobolo* in South Africa suggest that the practice is still widespread and that the payment remains substantial (in the region of over a year's worth of average earnings for African men), despite the inadequate economic opportunities facing this group of men.[2] For African women, the requirement of a financially suitable marriage partner may be driven not just by the expectation for the male to be the primary breadwinner or at least a significant contributor to household economic resources, but further by the need for the man to afford *ilobolo*. The payment of bridewealth would reinforce the "rigidity" in the marriage market referred to above; in this case a woman's reservation offer would also be based on the ability of the potential partner to pay *ilobolo*.

Earlier ethnographic research in South Africa has also made reference to the added financial pressures of *ilobolo* on the prospects of marriage (Hunter 2004; Hosegood *et al* 2009). This research has focused mostly on marriage traditions in the province of KwaZulu-Natal, which is home to the largest Zulu-speaking population and where *ilobolo* is practiced widely. Here marriage rates are the lowest in the country and rates of non-marital childbearing are among the highest. Research in this area also suggests that the practice and value of *ilobolo* are largely inflexible.[3] We therefore explore whether the relationship between the "marriageability" of available men and marriage among young African women is particularly strong in KwaZulu-Natal.

3 Data and methods

To investigate marriage markets in South Africa, we analyse samples of young African and white women (aged 20 to 34 years), drawn from the nationally representative LFS. These household surveys have been conducted biannually in South Africa since 2000. We consider specifically the September 2003 round of the survey (LFS 2003:2), although we show later that our results remain robust also for samples drawn from the September 2002 and March 2004 rounds (the LFS 2002:2 and LFS 2004:1 respectively).

Figure 1 describes large differences in marriage rates[4] among young African and white women in 2003. White women are significantly more likely than African women to be married and the gap in marriage rates remains large even as age increases. These differences are not simply the result of racial differences in the timing of marriage. Although marriage rates increase among older cohorts of African women, they remain significantly lower than marriage rates among white women. In 2003, only three percent of white women older than fifty had never been married, compared to 13 percent of African women in the same age cohort.

[Insert Figure 1 about here]

Marriage outcomes in 2003 are likely to reflect the nature of the marriage market, or the relative availability of male partners, over some period prior to 2003 rather than in that same year. We therefore use lagged sex ratios, generated from the 2001 Population Census data. The Census data have the advantage over household survey data of providing larger sample sizes at high levels

[2] There is no information collected on the payment of *ilobolo* in national household surveys in South Africa.Information collected in the 1998 wave of a regionally based panel study (the KwaZulu-Natal Income Dynamics Study), gives some indication of the extent to which *ilobolo* is still practiced, and its value. Of the married respondents aged 60 years or younger, three quarters reported making *ilobolo* payments with marriage. The average value of *ilobolo* reported for people married from 1985 to 1998 was approximately 20 000 Rands in 2000 prices, or almost 13 times the average monthly real earnings of black men in the 1998 sample (Casale and Posel 2009). This value is consistent with reports in other literature of *ilobolo* typically ranging from 10 000 Rands to 25 000 Rands (Kaarsholm 2005, Gustafsson and Worku 2006).

[3] Hosegood *et al* (2009: 284) write: "The legacy of the early Natal administrators is that they co-opted and codified bridewealth. While historically the amount of bridewealth was negotiated by the families involved and was rarely paid in full before the marriage took place, the Natal code subjected Zulu women to a fixed and very high bridewealth of eleven head of cattle or their equivalent value."

[4] The Labour Force Surveys from March 2000 to March 2004 do not distinguish between marriage and cohabitation. Consequently, our measures will overstate the true marriage rate, and because cohabitation rates are typically higher among African women than among white women (Budlender *et al* 2004), the difference between white and African marriage rates will be underestimated.

of disaggregation, thereby offering more reliable sex ratio measures than those which would be generated using the LFS data. Because marriage markets are still racially segregated, we construct separate sex ratios for whites and Africans. To better approximate the local marriage market, we estimate sex ratios at the district level, across the 53 district council and metropolitan areas in South Africa.

We assume that men tend to marry women typically who are up to three years younger, so that the sample of unmarried women aged 20 to 34 corresponds to the sample of unmarried men aged 23 to 37 years.[5] We then identify four district sex ratios which differ according to how the pool of marriageable men is defined. The first sex ratio (S_1) is simply the ratio of all unmarried men (23 to 37 years) to unmarried women (20 to 34 years).[6] In the second ratio (S_2), we restrict the pool of unmarried men to only those men with employment. In the third and fourth ratios (S_3 and S_4), male "marriageability" is identified according to the earnings of employed men. We distinguish a lower threshold at median earnings for the male cohort so that S_3 includes only those unmarried men with at least median earnings, and an upper threshold at mean earnings (for S_4).[7]

[Insert Table 1 about here]

Table 1 describes the average values of these district sex ratios for young Africans and whites in the 2001 Population Census. For both Africans and whites, sex ratios fall as the "marriageability" criteria increase. However, the fall is particularly dramatic for Africans. Although simple sex ratios are significantly higher for whites than for Africans, the difference is far larger when the ratios incorporate the economic status of potential male partners. The pool of marriageable men, relative to women, is approximately three-fold smaller for young African women than young white women. This large divergence in economic-based sex ratios reflects substantial differences in unemployment rates among young African and white men: in the 2001 Census, just over 50 percent of young African men were unemployed according to the expanded definition of unemployment (which includes the non-searching unemployed), compared to only five percent of young white men.

To test the relationship between the different sex ratios and marriage outcomes, we match the district sex ratios to the 2003 LFS data.[8] A large degree of racial segregation remains in residential living arrangements in South Africa, and whites in particular are heavily concentrated in a small number of districts, primarily in the metropolitan areas. Consequently, although the LFS sampled approximately 27 000 households (or 98 747 individuals), sample sizes particularly of young white women are very low in a large number of districts. In estimating marriage outcomes, we exclude all districts for which there are fewer than 10 young women in the sub-sample: of the 53 districts, we can identify marriage rates in 25 districts for whites and 51 districts for Africans.[9]

The first set of regressions estimates the probability of marriage among young women:

$$Pr(M_i = 1| \quad S_k X_i) \tag{1}$$

[5] We do not have data on age at first marriage in either the 2001 Population Census or the LFS data. Some US studies have used a two-year age gap to estimate sex ratios (Lichter et al 1992; Angrist 2002). Using national administrative data for South Africa in 1997, Statistics South Africa estimated the average age at first marriage to be 30 years for women and 34 years for men (Statistics South Africa 2000).

[6] It is possible that men who are in polygamous marriages will be considered part of the potential set of partners available to unmarried women. However, a negligible percentage of African men (0.14 percent) in the age group 23 to 37 years report being involved in polygamous marriages in the 2001 Population Census. We therefore do not adjust the sex ratio to reflect the potential availability of these men.

[7] Point values for earnings were not collected in the 2001 Population Census; instead, income was collected in bracket responses. To identify median and mean earnings, we estimated these values for the sample of unmarried young men in the September 2001 LFS, and then matched the estimates to the closest applicable income bracket in the Census. Because of a skewed earnings distribution in South Africa, mean earnings lie in a higher earnings bracket than median earnings, and given the legacy of racial segregation in the labour market, mean and median earnings for young white men are significantly higher than those for young African men.

[8] Mathews Phiri from Statistics South Africa kindly provided us with the information necessary to identify district councils and metropolitan areas in the LFS 2003 for comparability with the Census 2001.

[9] This resulted in the loss of six out of 9 855 observations in the African sample of women aged 20 to 34 years and 83 out of 914 observations in the white sample of young women.

where M_i represents woman i's current marital status (married or not), S_k captures the lagged sex ratio of the district k in which the woman resides; and X_i, represents a set of individual characteristics including a quadratic in age, education, location (whether living in an urban or rural area) and language spoken most often at home.[10] Separate probit regressions are estimated for African and white women, and for each of the four sex ratios.

If sex ratios approximate the marriage market, then we would expect the probability that a woman is married to be larger in districts where the sex ratio is higher. However, if the pool of men available for marriage depends also on the quality of these men, then sex ratios which capture economic status should be better predictors of marriage than simple sex ratios. Given the practice of bridewealth payment in South Africa, we would expect a stronger relationship between economic-based measures of "marriageability" and marriage outcomes particularly among African women: only those men who can afford *ilobolo* can enter the marriage market.

In the second set of regressions, we use ordinary least squares to estimate the relationship between marriage rates and sex ratios at the district level:

$$M_k = f(S_k, X_k) \tag{2}$$

where for k districts, M_k is the marriage rate (the proportion of women aged 20 to 34 who are married), S_k is the lagged district sex ratio, and X_k are district characteristics, including the average age of young women in the district, their average years of schooling, the proportion of young women in the district by language spoken at home, and the proportion of young women in the district located in an urban area.

In the remaining estimations, we test the robustness of our results by running a number of sensitivity tests. First, we test whether our results are robust to possible migration effects. In identifying an individual's marriage market, we used the individual's district of *residence*, i.e. sex ratios are defined in terms of "resident" men and women, where the requirement for residency is that the individual stays in the household for at least four nights on average per week. A possible concern with our study is if unmarried male migrants participate in marriage markets at their district of origin, then sex ratios may underestimate the availability of men in districts from which migration occurs (and overestimate the availability of men in destination areas). In the absence of data on labour migration in the 2001 Census, we use a module on migrant workers[11] included in the September LFS 2003 to estimate the ratio of unmarried male migrants to unmarried female migrants at the district level. We construct a migration index, identifying districts with low, medium and high unmarried male to female migration, which we include in the probit estimations.

Second, we consider alternative age restrictions for the samples of young women and men, as well as slightly modified definitions of the sex ratios. More specifically, we test whether our results remain robust for an extended age cohort of women aged 20 to 39 years (and men aged 23 to 42 years), and when we restrict economic-based measures of marriageable males to men with formal (non-farming) employment. Formal sector employment,[12] which tends to be more secure than informal sector employment, may offer a better indication of a man's future economic status and therefore his "marriageability".

Third, we investigate whether the relationship between marriage rates and sex ratios estimated for the September 2003 LFS, holds also for the September 2002 LFS and the March 2004 LFS.

A final concern with our estimations is potential endogeneity in the measure of marriageable men (Wood 1995). For example, if earnings are a function of marriage, then low marriage rates may explain why the pool of marriageable men, or higher-earning unmarried men, is so small. We do not have suitable instruments to control for this endogeneity in our estimations. However, research

[10] The mean and standard errors of the explanatory variables are provided in Table A1 in the Appendix.

[11] A migrant worker is defined as an individual who is reported as a member of the household but who is not resident in the household and is away for at least a month each year to work or to look for work.

[12] Formal sector employment here is based on a question in the Census 2001, which allows the respondent the following three options: 'formal registered (non-farming)', 'informal unregistered (non-farming)' and 'farming' employment.

on the male marital earnings premium in South Africa suggests that the marriage premium among African men derives from strong selection effects into marriage, rather than from the effects of marriage itself (Casale and Posel 2009). These findings suggest that only higher-earning men are able to afford marriage, which would also be consistent with the argument that *ilobolo* acts as a constraint to marriage.

4 Results

The results for the first set of regressions, which estimate the probability of marriage among young women aged 20 to 34 years, are reported in Tables 2a and 2b.[13] For both Africans and whites, the simple lagged sex ratio (S_1)is a significant predictor of the probability of marriage among young women. However, among African women, sex ratios which incorporate the economic status of men are consistently stronger predictors. The largest effect comes from the sex ratio which defines the male marriageable pool as men with earnings in excess of the average earnings of their cohort (S_4). The marginal effects calculated at the mean suggest a one percent increase in S_1 would increase the probability of marriage by 26 percent, while a corresponding increase in S_4 would increase the probability of marriage by approximately 72 percent.[14] Among whites, there is less convincing evidence that economic-based sex ratios perform better in explaining differences in the probability of marriage than the simple sex ratio. The coefficients for S_1, S_2 and S_3 are not significantly different from each other, and S_4 is not significant in the regression.

[Insert Tables 2a and 2b about here]

A possible explanation for why the probability of marriage increases dramatically among African women (and not among white women) when the pool of higher-earning unmarried men increases, concerns the practice of bridewealth. Because *ilobolo* is a sizeable payment, the "marriageability" criteria for African men may be more stringent, and only higher-earning men who can afford bridewealth payments are considered marriageable.

The tables also describe other racial differences in the determinants of marriage. For both African and white women, the probability of marriage increases with age, but the effect is much stronger for white women. At age 34, almost 90 percent of young white women are married, compared to only 48 percent of young African women. Whereas educational attainment seems to have no significant effect on the probability of marriage among white women, the probability of marriage decreases significantly as educational levels among African women rise. Compared to a woman with similar observed characteristics, possession of completed secondary (or higher) education reduces the probability of marriage by between 14 and 17 percent relative to having no schooling. Higher education would increase a woman's "reservation offer" in the marriage market, as it increases her employment opportunities and therefore the utility of being single.

The probability of marriage also differs significantly among women according to the language spoken most at home. In comparison to white women who report Afrikaans as their home language, English-speaking white women have a significantly lower probability of marriage. Among African women, the probability of marriage is significantly smaller among those who report their home language as Ndebele, Xhosa, Zulu, Northern Sotho or Tswana – languages which correspond to ethnic groups where the payment of bridewealth is practiced.

In Table 3, we repeat the probit regressions for African women but we restrict the sample to women living in KwaZulu-Natal. KwaZulu-Natal is a province in which the majority of Africans are Zulu-speakers who live in rural areas (in 2003, approximately 94 percent of all young African women in the province were Zulu-speakers, more than 60 percent of whom were rural-dwellers), and where the practice of bridewealth is relatively more widespread (Hosegood *et al* 2009). It is

[13] All the results in the individual regressions are robust to the correction of the standard errors for clustering at the level of the primary sampling unit.

[14] The marginal effects for the regressions in Tables 2a and 2b for Africans and whites are reported in Table A2 in the Appendix.

also the province in South Africa in which marriage rates among young African women are lowest: in 2003, only 19 percent of all young African women in KwaZulu-Natal were married compared to the national average of 30 percent.[15] Table 3 shows that the probability of marriage among African women in KwaZulu-Natal increases dramatically in districts where the pool of unmarried, higher-earning men is relatively larger. These results are clearly consistent with the argument that bridewealth payments are a financial constraint to marriage, raising the "marriageability" criteria for men.

[Insert Table 3 about here]

We also estimate the relationship between sex ratios and marriage outcomes (in this case marriage rates) at the district level. The estimated coefficients for the four sex ratios are reported in Table 4. For Africans, the pattern is consistent with estimations at the individual level. Sex ratios which capture the economic status of men, particularly in terms of their earnings, perform better in predicting district marriage rates than simple sex ratios. The results for whites, however, are noisy and insignificant, perhaps partly because of the small number of districts for which we have sufficient observations to generate sex ratios and marriage rates.

[Insert Table 4 about here]

5 Sensitivity tests

Our findings from both the individual-level and district-level regressions suggest that marriage outcomes among young African women are influenced more by the "quality" or economic status of unmarried men than by simply the number of unmarried men. Among white women, however, there is no clear evidence that economic-based measures of "marriageability" are stronger predictors of marriage outcomes. In this section, we test the robustness of our findings to a range of sensitivity tests.

First, we control for the possible effects of labour migration on marriage outcomes. If men who are labour migrants participate in marriage markets in their district of origin,[16] then sex ratios, which are calculated for resident individuals, will underestimate the pool of marriageable men in areas from which this migration occurs. To control for migration effects, we include two dummy variables in the probit estimations, representing districts with "medium" and "high" migration ratios, with "low" migration as the base category. The migration ratios are calculated as the ratio of unmarried male labour migrants to unmarried female labour migrants in the district.[17] Because very few whites are reported as labour migrants, we generate the migration variables only for the African sample.

Table 5 reports the results of these probit regressions. The migration coefficients are negative, suggesting that for women living in districts with higher relative male labour migration, the probability of marriage is lower, but the coefficients are not significant. The effects of the sex ratio variables, however, remain significant and consistent with earlier estimations: the probability of marriage for young African women increases as the economic status of available men increases, and particularly when there is a larger pool of higher-earning unmarried men.

Second, we test the relationship between sex ratios and marriage outcomes when we extend the upper age threshold for women to 39 years (and to 42 years for men), and when we restrict the "marriageability" criteria in the economic-based sex ratios (S_2 to S_4) to men with formal sector employment. The coefficients for both the individual-level and district-level regressions are reported in Table 6.

[15] The next lowest marriage rates by province were in the Eastern Cape and North West province, where 26 percent of African women in the 20 to 34 age cohort were married.

[16] A key impetus for labour migration historically was for men to generate income needed for *ilobolo* payments to marry women who typically resided in their communities of origin (Hunter 2004).

[17] This index is calculated using the LFS 2003:2 data as there is no information on migration in the 2001 Population Census (or in the 2001 LFS).The LFSs which include a migration module do not collect information on the age of the migrant worker, and we therefore could not identify a ratio of young migrants specifically.

[Insert Table 5 about here]

The sex ratio coefficients remain large and significant throughout for the African sample, and the patterns are consistent across both the individual-level and district-level regressions. The results for whites are also largely unchanged: in the individual regressions, simple sex ratios perform as well in predicting marriage outcomes as sex ratios which reflect men's economic status; and estimates for the district regressions remain noisy and insignificant. For the African sample, the estimated coefficients on the sex ratio variables are generally lower in the regressions with the extended age range, indicating perhaps that when a wider definition of the relevant marriage market is used, the relationship between sex ratios and marriage is diluted.[18] When the marriageable pool includes only men with formal sector employment for ratios S_2 to S_4, the coefficients are somewhat larger. This is expected if having formal-sector employment is considered a more desirable attribute, as it offers greater job security and probably better future potential earnings than informal-sector employment.

[Insert table 6 about here]

In the final set of tests, we considered alternative lags for our sex ratio variables, by matching the 2001 district sex ratios to samples drawn from the LFS 2002:2 and the LFS 2004:1. The results, described in Table 7, show that sex-ratio effects remain largely consistent, sizeable and significant for Africans in both years, although the coefficients are clearly smaller in 2002. Among white women, the results are noisy and none of the sex ratio variables remains significant even in the individual-level regressions.

[Insert Table 7 about here]

6 Conclusion

In this paper, we investigated the relationship between marriage and the availability of suitable or marriageable partners among African and white women in South Africa. In particular, we tested whether economic-based measures of "marriageability", which take into account the quality of available men, perform better in predicting marriage than simple sex ratios, which capture only the quantity of available men.

For young African women, the probability of marriage is positively and significantly related to the local pool of unmarried African men, but the effect is far stronger where these men are employed with earnings above a certain threshold (and particularly the mean for their cohort). One explanation that is consistent with these findings is that bridewealth raises the "marriageability" criteria for African men; only men who can afford to pay *ilobolo* are considered "marriageable". Further evidence is provided in the stronger results we find for the province of KwaZulu-Natal, where the custom of bridewealth is most strictly observed. In contrast, among the sample of young white women, simple sex ratios perform as well in predicting marriage as measures which take into account the economic attractiveness of white men.

These results suggest that part of the reason why marriage rates are much lower among African women is because the economic status of men matters more for their "marriageability". At the same time, the supply of marriageable men is small given high unemployment rates and relatively low earnings among a majority of employed African men. This mismatch in the marriage market for Africans should imply that the value of *ilobolo* falls, reducing women's reservation offer and making it easier for men to marry. However, this research supports the view that bridewealth is relatively inflexible in South Africa and therefore acts a key constraint to marriage among Africans.

[18] Although not shown here, the results from the set of regressions for a narrower age range of 20 to 29 years for women (and 23 to 32 years for men) are consistent with this pattern for the African sample. The regressions results for Whites are not considered reliable as the sample size was reduced substantially with the exclusion of additional districts with less than 10 observations.

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Appendix

Table A1. Individual characteristics of young women aged 20 to 34 years, 2003

	Africans	Whites
Married	0.307	0.642
	(0.006)	(0.022)
Age	26.335	27.275
	(0.051)	(0.189)
Grade 1 – grade 7	0.160	0.004
	(0.005)	(0.002)
Grade 8 – grade 11	0.446	0.132
	(0.006)	(0.014)
Grade 12 (Matric)	0.292	0.512
	(0.006)	(0.024)
Post-matric	0.071	0.350
	(0.003)	(0.023)
Urban	0.503	0.924
	(0.006)	(0.010)
Afrikaans	0.004	0.556
	(0001)	(0.024)
English	0.007	0.432
	(0.002)	(0.024)
Ndebele	0.020	--
	(0.002)	
Xhosa	0.209	--
	(0.005)	
Zulu	0.314	--
	(0.006)	
Northern Sotho	0.113	--
	(0.004)	
Southern Sotho	0.111	--
	(0.004)	
Tswana	0.101	0.002
	(0.003)	(0.002)
Swazi	0.031	--
	(0.002)	
Venda	0.030	--
	(0.002)	

Tsonga	0.057	--
	(0.003)	
Other language	0.002	0.011
	(0.001)	(0.005)
Unweighted sample size	9,849	831

Source: LFS 2003:2
Notes: The data are weighted. Standard errors are in parentheses. All districts for which there are less than ten observations to generate a sex ratio or a marriage rate have been excluded.

Table A2. The probability of marriage and sex ratios among African and white women aged 20 to 34 years, 2003, marginal effects

	AFRICAN				WHITE			
	I	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
S_1 (all unmarried men)	0.259	--	--	--	0.248	--	--	--
S_2 (unmarried employed men)	--	0.301	--	--	--	0.215	--	--
S_3 (unmarried men with at least median earnings)	--	--	0.319	--	--	--	0.251	--
S_4 (unmarried men with at least average earnings)	--	--	--	0.721	--	--	--	0.123
Age	0.129	0.128	0.129	0.129	0.308	0.307	0.308	0.309
Age^2	-0.002	-0.002	-0.002	-0.002	-0.005	-0.005	-0.005	-0.005
Grade 1 – grade 7	-0.044	-0.040	-0.039	-0.043	0.271	0.267	0.265	0.263
Grade 8 – grade 11	-0.110	-0.104	-0.105	-0.108	0.170	0.159	0.154	0.155
Grade 12 (matric)	-0.177	-0.172	-0.173	-0.176	0.108	0.093	0.088	0.089
Tertiary	-0.152	-0.149	-0.151	-0.153	0.170	0.154	0.145	0.146
Urban	-0.016	-0.010	-0.005	-0.008	-0.164	-0.169	-0.182	-0.192
English	0.040	0.063	0.033	0.040	-0.052	-0.056	-0.065	-0.056
Ndebele	-0.138	-0.132	-0.144	-0.142	--	--	--	--
Xhosa	-0.132	-0.106	-0.133	-0.128	--	--	--	--
Zulu	-0.157	-0.141	-0.163	-0.161	--	--	--	--
Northern Sotho	-0.095	-0.081	-0.100	-0.099	--	--	--	--
Southern Sotho	-0.073	-0.048	-0.065	-0.062	--	--	--	--
Tswana	-0.162	-0.152	-0.166	-0.154	--	--	--	--
Swazi	-0.048	-0.052	-0.050	-0.041	--	--	--	--
Venda	0.076	0.097	0.064	0.065	--	--	--	--
Tsonga	0.009	0.030	0.004	0.004	--	--	--	--
Other language	0.073	0.114	0.079	0.080	--	--	--	--
Unweighted sample size	9,849	9,849	9,849	9,849	831	831	831	831

Source: LFS 2003:2

Table 1. District sex ratios among Africans and whites, 2001

	Africans	Whites
S_1 = Σ (unmarried men)/Σ (unmarried women)	0.796	0.996
	(0.000)	(0.037)
S_2 = Σ (unmarried men with employment)/	0.260	0.783
Σ (unmarried women)	(0.000)	(0.030)
S_3 = Σ (unmarried employed men with at least median	0.156	0.444
earnings)/Σ (unmarried women)	(0.000)	(0.022)
S_4 = Σ (unmarried employed men with at least average	0.067	0.209
earnings)/Σ (unmarried women)	(0.000)	(0.016)

Source: South African Population Census 2001

Notes: The data are weighted. Standard errors are in parentheses. All means are significantly different at a 99 percent confidence level.

Monthly median earnings (in 2001 prices) for S_3 are estimated at 801 Rands and 5 201 Rands for African and white men respectively; and monthly average earnings for S_4 are estimated at 1 601 Rands and 6 401 Rands for African and white men respectively.

For whites, three districts with less than ten observations for unmarried young men and women have been excluded, and one outlier district with a simple sex ratio of over 120 has also been excluded.

Table 2a. The probability of marriage and sex ratios, African women aged 20 to 34 years, 2003

	I	II	III	IV
S_1	0.986***	--	--	--
(all unmarried men)	(0.137)			
S_2	--	1.098***	--	--
(unmarried employed men)		(0.171)		
S_3 (unmarried men with at	--	--	1.238***	--
least median earnings)			(0.204)	
S_4 (unmarried men with at	--	--	--	2.805***
least average earnings)				(0.469)
Age	0.379***	0.375***	0.379***	0.382***
	(0.059)	(0.059)	(0.059)	(0.059)
Age^2	-0.005***	-0.005***	-0.005***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)
Grade 1 – grade 7	-0.075	-0.061	-0.056	-0.068
	(0.096)	(0.096)	(0.095)	(0.095)
Grade 8 – grade 11	-0.307***	-0.290***	-0.288***	-0.300***
	(0.091)	(0.091)	(0.091)	(0.090)
Grade 12 (matric)	-0.547***	-0.523***	-0.526***	-0.541***
	(0.108)	(0.094)	(0.094)	(0.093)
Tertiary	-0.542***	-0.527***	-0.534***	-0.549***
	(0.108)	(0.108)	(0.108)	(0.107)
Urban	-0.009	0.026	0.039	0.029
	(0.043)	(0.042)	(0.042)	(0.044)
English	0.140	0.188	0.111	0.128
	(0.321)	(0.314)	(0.318)	(0.319)
Ndebele	-0.631***	-0.620***	-0.669***	-0.661***
	(0.213)	(0.216)	(0.216)	(0.215)
Xhosa	-0.495***	-0.412***	-0.496***	-0.476***
	(0.178)	(0.082)	(0.181)	(0.181)
Zulu	-0.672***	-0.624***	-0.692***	-0.692***
	(0.176)	(0.179)	(0.180)	(0.179)
Northern Sotho	-0.421***	-0.379**	-0.437**	-0.440**
	(0.182)	(0.184)	(0.185)	(0.185)

Southern Sotho	-0.346*	-0.263	-0.308*	-0.304*
	(0.180)	(0.182)	(0.183)	(0.183)
Tswana	-0.723***	-0.680***	-0.733***	-0.678***
	(0.181)	(0.184)	(0.186)	(0.184)
Swazi	-0.249	-0.290	-0.251	-0.222
	(0.196)	(0.199)	(0.199)	(0.199)
Venda	0.249	0.293	0.219	0.217
	(0.201)	(0.204)	(0.204)	(0.203)
Tsonga	0.046	0.094	0.033	0.029
	(0.187)	(0.189)	(0.190)	(0.190)
Other language	-0.228	-0.108	-0.194	0.199
	(0.528)	(0.520)	(0.520)	(0.521)
F statistic	37.07	36.49	36.28	35.99
Unweighted sample size	9,849	9,849	9,849	9,849

Source: LFS 2003:2

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. ** Significant at the 95 percent confidence level. * Significant at the 90 percent confidence level.
The omitted educational category is no schooling; the omitted language is Afrikaans.

Table 2b. The probability of marriage and sex ratios, white women aged 20 to 34 years, 2003

	I	II	III	IV
S_1 (all unmarried men)	0.926**	--	--	--
	(0.384)			
S_2 (unmarried employed men)	--	0.877*	--	--
		(0.462)		
S_3 (unmarried men with at least median earnings)	--	--	1.017*	--
			(0.571)	
S_4 (unmarried men with at least average earnings)	--	--	--	0.529
				(0.789)
Age	0.740***	0.735***	0.733***	0.734***
	(0.192)	(0.193)	(0.193)	(0.194)
Age^2	-0.011***	-0.011***	-0.011***	-0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
Grade 1 – grade 7	0.995	0.984	0.979	0.959
	(0.832)	(0.815)	(0.800)	(0.803)
Grade 8 – grade 11	0.444	0.411	0.399	0.407
	(0.608)	(0.579)	(0.557)	(0.563)
Grade 12 (matric)	0.229	0.184	0.162	0.163
	(0.591)	(0.561)	(0.538)	(0.544)
Tertiary	0.345	0.290	0.248	0.251
	(0.599)	(0.569)	(0.547)	(0.552)
Urban	-0.477*	-0.501*	-0.547*	-0.573**
	(0.284)	(0.288)	(0.286)	(0.283)
English	-0.261**	-0.275**	-0.313**	-0.274**
	(0.132)	(0.132)	(0.137)	(0.141)
F statistic	14.25	14.20	14.47	13.68
Unweighted sample size	831	831	831	831

Source: LFS 2003:2

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. ** Significant at the 95 percent confidence level. * Significant at the 90 percent confidence level. The omitted educational category is no schooling and the omitted language is Afrikaans.

Table 3. The probability of marriage and sex ratios, African women aged 20 to 34 years living in KwaZulu-Natal, 2003

	Coefficient
S_1 (all unmarried men)	0.343
	(0.512)
S_2 (unmarried employed men)	0.876
	(0.728)
S_3 (unmarried men with at least median earnings)	2.513***
	(0.893)
S_4 (unmarried men with at least average earnings)	5.871***
	(2.138)
Unweighted sample size	1,984

Source: LFS 2003:2

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. The probit regressions include the same set of independent variables as that reported in Table 2a.

Table 4. Marriage rates and sex ratios by district, 2003

	I (S_1)	II (S_2)	III (S_3)	IV (S_4)
African (n = 51)	0.580***	0.502**	0.666**	1.584***
	(0.180)	(0.195)	(0.285)	(0.555)
White (n = 25)	0.052	-0.234	0.150	-0.172
	(0.138)	(0.166)	(0.439)	(0.487)

Source: LFS 2003:2

Notes: Robust standard errors are in parentheses. *** Significant at the 99 percent confidence level. ** Significant at the 95 percent confidence level. The sample includes all women aged 20 – 34 years. The regressions also include weighted district-level variables for age, years of schooling, location (urban or rural) and language spoken.

Table 5. The probability of marriage and sex ratios with migration effects, African women aged 20 to 34 years, 2003

	I	II	III	IV
S_1	1.002***	--	--	--
	(0.139)			
S_2	--	1.098***	--	--
		(0.172)		
S_3	--	--	1.253***	--
			(0.207)	
S_4	--	--	--	2.787***
				(0.472)
Medium migration ratio	-0.055	-0.032	-0.050	-0.024
	(0.043)	(0.043)	(0.043)	(0.043)
High migration ratio	-0.026	-0.060	-0.062	-0.035
	(0.058)	(0.058)	(0.057)	(0.058)
F statistic	33.62	32.96	32.80	32.58
Unweighted sample size	9,849	9,849	9,849	9,849

Source: LFS 2003:2

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. The migration ratio is calculated as the district ratio of unmarried male labour migrants to unmarried female labour migrants. A low migration ratio is the omitted variable. The probit regressions also include the same set of independent variables as that reported in Table 2a.

Table 6. Marriage and sex ratios: sensitivity tests for age and economic status, 2003

	I (S_1)	II (S_2)	III (S_3)	IV (S_4)
	Extended age range (20 – 39 years)			
Individual-level regressions				
African (n=12,357)	0.826***	0.974***	1.128***	2.566***
	(0.130)	(0.161)	(0.192)	(0.433)
White (n=1,205)	0.772**	0.758*	0.828	0.085
	(0.351)	(0.408)	(0.528)	(0.673)
District-level regressions				
African (n=51)	0.619***	0.521***	0.732**	2.067***
	(0.193)	(0.193)	(0.340)	(0.658)
White (n=29)	0.015	-0.043	0.035	-0.040
	(0.102)	(0.129)	(0.250)	(0.261)
	Redefining sex ratios – formal employment			
Individual-level regressions				
African (n=9,849)	0.986***	1.248***	1.352***	2.987***
	(0.137)	(0.204)	(0.225)	(0.504)
White (n=831)	0.926**	0.608	0.634	0.554
	(0.384)	(0.511)	(0.583)	(0.778)
District-level regressions				
African (n=51)	0.580***	0.779**	0.749**	1.611***
	(0.180)	(0.304)	(0.342)	(0.611)
White (n=25)	0.052	-0.166	-0.081	-0.076
	(0.138)	(0.220)	(0.394)	(0.465)

Source: LFS 2003:2

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. ** Significant at the 95 percent confidence level. * Significant at the 90 percent confidence level. The regressions include a full set of independent variables specified in Tables 2a and 2b for the individual-level regressions and in Table 4 for the district-level regressions.

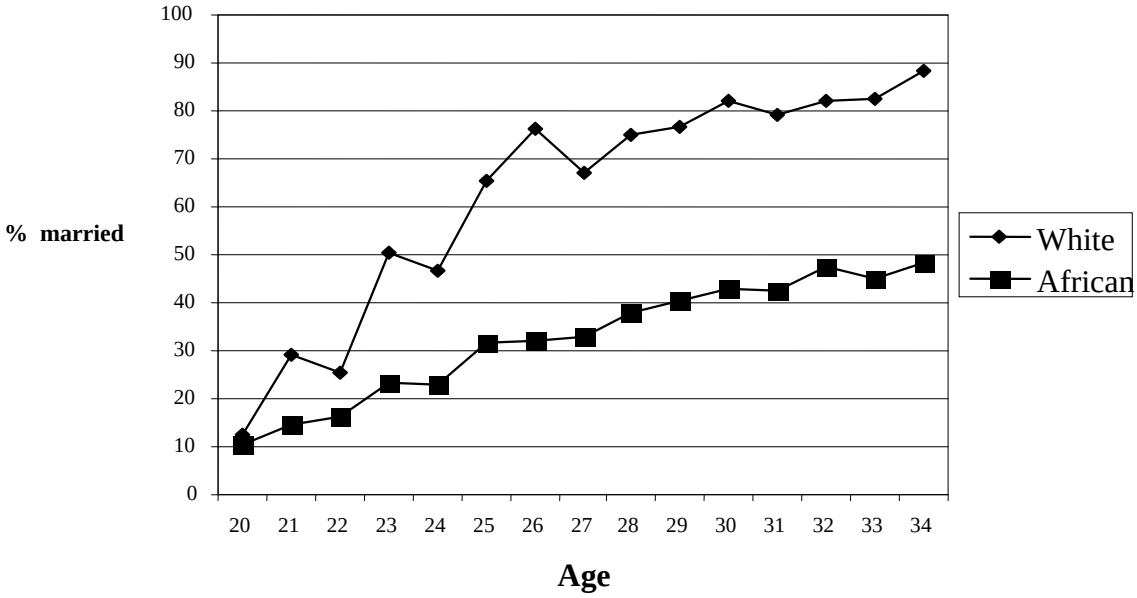
Table 7. Marriage and sex ratios, using data from 2002 and 2004

	I (S_1)	II (S_2)	III (S_3)	IV (S_4)
	LFS 2002:2			
Individual-level regressions				
African (n=10,234)	0.708***	0.785***	0.743***	1.742***
	(0.131)	(0.163)	(0.196)	(0.460)
White (n=736)	0.191	0.136	-0.643	-1.161
	(0.338)	(0.392)	(0.643)	(0.849)
District-level regressions				
African (n=51)	0.387***	0.393***	0.463***	1.282***
	(0.054)	(0.095)	(0.169)	(0.556)
White (n=22)	-0.017	0.042	0.184	0.223
	(0.111)	(0.120)	(0.285)	(0.620)
	LFS 2004:1			
Individual-level regressions				
African (n=10,055)	0.998***	0.885***	1.047***	2.476***
	(0.140)	(0.176)	(0.213)	(0.489)
White (n=772)	0.218	0.077	-0.231	-0.981
	(0.374)	(0.450)	(0.614)	(0.820)
District-level regressions				
African (n=50)	0.538**	0.349*	0.529***	1.224***
	(0.214)	(0.182)	(0.360)	(0.493)
White (n=24)	0.089	-0.170	-0.256	-0.679
	(0.116)	(0.182)	(0.376)	(0.453)

Source: LFS 2002:2 and LFS 2004:1.

Notes: The data are weighted. Standard errors are in parentheses. *** Significant at the 99 percent confidence level. ** Significant at the 95 percent confidence level. * Significant at the 90 percent confidence level. The regressions include a full set of independent variables specified in Tables 2a and 2b for the individual-level regressions and in Table 4 for the district-level regressions.

Figure 1. Marriage rates among African and white women aged 20-34 years, 2003



Source: LFS 2003:2.