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Determiners of Age At First Marriage of Women in Ivory Coast.

Godji Gérard Elie*
** PhD student in Economics at the UFR of Economics and Management, FHB University of Cocody-Abidjan, E-Corresponding Author: Godji Gérard Elie*

Abstract: *This study examines age determiners of women's first marriage in Cote d'Ivoire. The age determiners of Ivorian women's first marriage have not been studied at the socio-economic level in Cote d'Ivoire. Though the law sets the minimum age of entering marriage at 18 years for women in Cote d'Ivoire, 12% were already in union of marriage when reaching 15 years old. 36% were also in union of marriage before 18 years old (EDSCI 2012). It is therefore probable to have some factors which explain the age of women's first marriage.*

The analysis is based on the secondary data of EDS-MICS 2012. The following methodology is used to reach our objectives: Considering EDS-MICS 2012 data, we analyzed the data with the descriptive statistics tool and Cox regression model. The results obtained suggest that age, region, residential area and educational level explain the age of women's first marriage in Cote d'Ivoire.

Keywords : *First marriage age, early marriage, Cox model.*

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I. Introduction

Marriage is an important institution for an individual and the society as whole. For an individual, it is an important and memorable event in his life cycle, as well as an important foundation in the process of family formation. In addition, marriage marks the beginning of the transition to adulthood as the individual leaves the paternal home, even though generations continue to be socially and economically interdependent across the extended family. Age at marriage is particularly interesting because it marks the transition to adulthood in many societies; the moment when certain options for education, employment and participation in society are grasped, as well as the beginning of regular exposure to pregnancy and maternity risks for women (Palamuleni, 2011).

For the society as whole, it unites several individuals from different families and represents the creation of a production and consumption unit chain, as well as a unit for the exchange of goods and services (Quisumbing and Hallman, 2003).).

In some societies, marriage defines the beginning of socially acceptable time for sexual activity and procreation. Marriage is not only the most predominant context for procreation but also one of the most important determiners of fertility (Bongaarts, 1983).

Women who marry early will, on average, have a longer period of exposure to the risk of pregnancy, often leading to higher fertility. Historically, societies in which women are older at first marriage have experienced lower fertility rates, while in traditional Asian and African populations where the age at first marriage is younger, observed high levels of fertility (Bongaarts, 1983).

It is important to understand the changing age of entrance into marriage because it helps to explain the difference in fertility across populations and also helps to explain fertility trends in individual populations. (United Nations, 1990, Ezeh and Dodoo, 2001). As a result, age at the beginning of marriage has a direct impact on fertility behavior (Davis and Blake 1965, Coale 1971, Lesthaeghe et al.

Age at first marriage is of interest to social demographers, and an understanding of the time of women's marriage is of interest. Primarily, because of its perceived positive association with fertility. Indeed, entrance into sexual unions is considered as one of the determiners of human fertility (Bongaarts, 1982, Davis and Blake, 1956). Early marriage potentially affects reproductive life and therefore has a positive influence on fertility.

Women who marry early in their lives will be associated with procreation in most cases, especially in the developing world. The main purpose of marriage is to have children. Early pregnancy is fraught with risks to the health of the mother and child. Young women are more likely to have pregnancy-related complications. And they will be less able to deal with those complications, which often leads to maternal death (Zabin and Kiragu, 1998). Children born to young mothers are usually at high risk of morbidity and mortality (Casterline and Trussell 1980, Zabin and Kiragu 1998, Ikamari 1996).

Another important issue related to early marriage is related to the suggestions that early marriage in some parts of the world leads to higher rates of divorce (Jones, 1992, VandenHeuvel and McDonald, 1994).

Deferred age at marriage has a direct influence on completed fertility by reducing the number of years available for procreation (Amin, 1995, Jensen and Thornton, 2003).

Given the importance of age at marriage in an individual's life history, fertility and mortality, it is surprising that only few analytical studies have been undertaken to investigate the determiners and consequences models in Ivory Coast. However, studies elsewhere have identified a number of factors that influence the moment of entrance into marriage (Hertrich, 2002, Singh and Samara, 1996, Jejeebhoy, 1995, Oppenheimer, 1988, Bloom and Trussell, 1984, Rindfuss and St. John , 1983).

Increases in age at marriage are associated with major sociocultural changes such as an increase of education level, urbanization and an emergence of new roles for women (United Nations, 1987, 1988, Lesthaeghe et al. 1989, Singh and Samara 1996, Kaufman and Meekers 1998). Jejeebhoy (1995) analyzed 51 previous studies based on a number of data which sources come mainly from global fertility surveys and Demographic and Health Surveys (DHS), and found that education is the strongest factor related to deferred marriage. But the relationship may be subject to threshold effects. Walker, (2012) describes the sub-Saharan region as the region where early marriage rates are the highest in the world. This last work also highlights the harmful effects of early marriage in terms of impact on the health, education and well-being of young girls (Aryee, 1977). Indeed, many women in the developing world are subject to marriage from an early age (Van de Walle and Meekers, 1994). Most of these women have little choice as to the age at which they marry (Jensen and Thornton, 2003).

Hertrich and Leschingand, (2012) argue that the weakening of family control over marriage and greater involvement of young people in the choice of spouse could also have triggered this transition in marriage leading to increased age at first marriage.

In Ivory Coast, just over three out of five women (63%) live in a union. Although Law No. 83-800 of August 2nd , 1983 sets the minimum age for marriage at 18 for women, 12% of women were already in union reaching 15 years old and 36% were married before being 18 years old. The fact is that, women enter the first union earlier than men. Half of women entered first union before 19.7 years old (EDS MICS 2011-2012). But delayed marriage allows women to complete their studies, to develop their skills and their careers that compete with motherhood. These professional interests can motivate women to limit family size and / or take into account the spacing of births (Amin, 1995, Jensen and Thornton, 2003).

This leads us to question the effects of demographic, socio-economic and socio-cultural variables on age at first marriage for women in Ivory Coast.

The overall objective of our study is to determine the factors that affect women's age at first marriage. Specifically, the purpose is to analyze the determinants of women's first marriage age and to determine the effect of demographic, socio-economic and socio-cultural factors on women's age at first marriage.

The analysis is based on information obtained from the 2011-2012 DHS MICS. In this survey, 10,060 women were interviewed successfully.

This study is of interest since a detailed understanding of the effects of demographic, socio-economic and socio-cultural factors on age at first marriage among Ivorian women and knowledge will stimulate research around age at first marriage. They will provide evidence-based information to policymakers to better develop policies and programs that, if implemented, will increase the age at first marriage for women in Ivory Coast. Thus, this study is important because the age at first marriage of women in Ivory Coast has been and remains a major factor of fertility.

The degree of success of health programs, in Ivory Coast, can be established on the basis of the observable increase in age at first marriage and the decline in fertility.

To achieve our goals, our work will be divided into three main parts: the first part is literature review; the second part is about data and methodology research. The third part will focus on the results and its implications in terms of economic policy. A conclusion and some recommendations will be made at the end of the document.

II. Theoretical and empirical aspects

2.1 Theoretical aspects

The classic Becker model, the comparison of the age of women at first marriage, the descriptive analysis of the evolution of the legal age of women at first marriage, the economic reasons for marriage, and patterns of marriage matching. wedding market will be discussed in this section.

2.1.1 The microeconomic theory of fertility: The classic Becker model

The proper microeconomic framework of reproductive behavior analysis was first introduced in the 1960s by Becker. He examined a large number of social behaviors (such as discrimination, crime, education) from an economic rationality view. The aim is to apply the models of the marginalist (neoclassical) economy to

family demography, and in particular to account for the decrease of fertility in rich countries[1]. The basic premise of microeconomic analysis will be to consider the household as a relatively autonomous economic unit with objectives, constraints and strategies. Consequently, fertility behaviors will be analyzed as endogenous, that is to say, stemming from choices determined internally by the couple or the reference household unit. Such an approach is obviously opposed to an analysis of fertility as an uncontrolled phenomenon produced by external constraints such as ignorance or social norms.

The most cited model is the one that appears in Becker's and Lewis' (1974) studies of the interaction between the quantity and quality of children.

For Becker and Lewis (1974), there is a relationship between the number of children (quantity) and the quality of children perceived by others, even by parents. There is a negative correlation between the quantity and quality of children per family.

Some economists have argued that the negative relationship between quantity and quality often observed is the consequence of a low elasticity of substitution of the family utility function between parents' consumption or their standard of living and that of their children (cf. Duesenberry 1960, Willis 1969).

The main characteristic of the analysis is that the fictitious price of children in relation to their number (i.e the extra cost of a child by maintaining a constant quality) is as higher as their quality is. Similarly, the fictitious price of children in relation to their quality (that is, the cost of increasing a unit of quality, by keeping the number constant) is even greater as the number of children is high.

In the analysis, the quantity-quality distinction is made only for children.

So, to illustrate our reasoning, we specify the following simple utility function:

$$U = U(n, q, y), \qquad (1)$$

n represents the number of children, **q** their quality (assumed to be the same for all children), and y the consumption rate of all other products.

We start with a simple budget restriction:

$$I = nq\pi + y\pi_y, \qquad (2)$$

I represents the complete income, π is the price of **nq**, and π_y is the price of **y**. We make no particular assumption about the elasticities of substitution between n, q and y, either in the utility function or in the domestic production functions that underlie them.

The first order conditions for maximizing the utility function subject to the budget constraint are:

$$MU_n = \lambda q\pi = \lambda p_n;\ MU_q = \lambda n\pi = \lambda p_q;\ MU_y = \lambda \pi_y = \lambda p_y \qquad (3)$$

MUs stand for marginal utilities, **P** represents marginal costs or fictitious prices, and **λ** the marginal utility of money income. The important point is that the fictitious price of children in relation to the number (p_n) is positively related to q, the quality level and the price of children in relation to quality (p_q) is positively related to n, the number of children.

The economic interpretation is that an increase in quality is more expensive if there are more children. Because the increase must apply to more units; likewise, an increase in quantity is more expensive if the children are of better quality, because the children of higher quality cost more.

These equilibrium conditions (3) and second order conditions can be found in several places in the quantity and quality literature (Houthakker 1952, Theil 1952, Becker 1960), but a certain number of their implications is important.

- ✓ **Income effects**

When we vary the income by keeping the prices constant and we consider the elasticities of the demand for the number (n) and the quality (q) of the children and for the other products (y) (η_n ,η_q ,η_y). The appropriate prices for this purpose are shadow prices (marginal costs) and P_n, P_q and P_y whose equilibrium ratios (see equation 3) are equal to the marginal substitution rates in the utility function. The average value of real income elasticities is unity.

[1] Different aspects of Becker's theories, notably on fertility and nuptiality , are collected in Becker (1991).

✓ **Effect on prices**

In discussing the effects on prices, we find that there is an increase in the shadow price of quantity (p_n) in relation to both the shadow price of quality (p_q) and the shadow price of y(p_y).But the decrease in the number of contraceptives reduces the fictitious price of quality, which leads to a substitution in favor of quality. The result would be not only a decrease in quantity but also a relatively large increase in quality, i.e other products - without assuming that quantity and quality are better substitutes than two randomly selected products.

In the end, it appears that the increase in the education of mothers has a significant positive effect on quality and a significant negative effect on the number of children. The common conviction that significant advances in birth control do not only significantly reduce the number of children, but also significantly increase their quality is consistent with the previous analysis.

Quantity and quality are closely related because the fictitious price of quality depends on the quantity. And the fictitious price of the quantity depends on the quality.

The price elasticity of quantity exceeds that of quality, exactly the opposite of our conclusion for observed income elasticities. This reversal of quantity-quality order for price and income elasticities is not only a somewhat unexpected implication of the analysis, but also gives a coherent interpretation to the conclusions of De Tray and others.

2.1.2 Comparison of women's age at first marriage

Table summarizing the age of women at marriage in different countries of the world[2]

Table 1: Country whose age is between 0 and 15 years

COUNTRIES	LEGAL AGE AT MARRIAGE (YEARS)
Yemen	0
Iran	9
Saoudi Arabia	10
Sudan	10
United States	12
Colombia	12
Equator	12
Syria	13
Belarus	14
Papouasie New Guinea	14
Bolivia	14
Venezuela	14
Mexico	14
Panama	14
South Africa	15
Angola	15
Democratic Republic of Congo	15
Gabon	15
Niger	15
Irak	15
Costa Rica	15

Source: www.tuxboard.com/cards/marriage-marriage/

Table 2: Countries whose age of women at marriage is between 16 and 21 years old.

COUNTRIES	LEGAL AGE AT MARRIAGE (YEARS)
Canada	16
Brazil	16
Peru	16
Zambia	16
Togo	16
Mali	16
Senegal	16
Russia	16
Ukraine	16
Spain	16
Portugal	16
United Kingdom	16
Norway	16
Japan	16
South Korea	16

[2] We considered some countries per continent

Turkey	16
Burkina Faso	17
Argentina	18
Namibia	18
Botswana	18
Zimbabwe	18
Tanzania	18
Kenya	18
Burundi	18
South Sudan	18
Ethiopia	18
Central	18
Cameroon	18
Congo	18
Chad	18
Nigeria	18
Ghana	18
Ivory Coast	18
Benin	18
Liberia	18
Guinea	18
Mauritania	18
Morocco	18
Egypt	18
Germany	18
Sweden	18
France	18
Finland	18
Croatia	18
North Korea	18
Israel	18
Algeria	19
Libya	20
China	20
Lesotho	21

Source: www.tuxboard.com/cards/marriage-marriage/

2.1.3 Descriptive analysis of the evolution of legal age of marriage

For African countries: most African countries have a legal age of women at marriage that is equal to 18 years. For the countries included in our study, we have 22 countries, including Ivory Coast. We also have 5 African countries with have a legal age of marriage equal to 15 years. 4 countries set their legal marriage age at 16 years old. Burkina Faso is 17 years old as the legal age of marriage. Algeria, Libya and Lesotho have 19, 20 and 21 years respectively as the legal age of marriage. The legal marriage age of 10 years in Sudan makes it the African country with the lowest legal age at first marriage.

- ✓ **For European countries**

Belarus's legal marriage age is 14. Spain, Portugal, Italy and the United Kingdom are 16 years old as the legal age of marriage. Germany, France, Sweden, Finland and Croatia are 18 years old as the legal age of marriage.

- ✓ **For the countries of Asia**

According to UNICEF, 32% of Yemeni girls are married before the age of 18 and 9% are married before 15 years old. There is no legal age to marry in Yemen. In addition, the country is affected by a civil war. The legal marriage age in Iran is 9. In Saudi Arabia 10, Iraq 15, South Korea, Japan and Turkey 16, Israel 18 and 20 for China.

- ✓ **For the countries of America**

The legal age of marriage is 12 in the United States, Colombia and Ecuador, 14 for Bolivia, Venezuela, Mexico and Panama, 15 for Costa Rica, 16 for Canada, Brazil and Peru and 18 for Argentina.

- ✓ **For the countries of Oceania**

The legal age of marriage is 14 in Papua New Guinea, 16 in Australia and New Zealand.

2.1.4 The economic reasons for marriage

Yoram Weiss (1997) notes that, from an economic point of view, marriage (more generally, living in pairs) can be considered as a partnership aimed at achieving both consumptive consumption and production. The most important and universally recognized of these productions is, of course, giving birth and educating children. But we can advance three other advantages related to the life in couple:

-*The division of labor*, which allows to benefit from economies of scale and to exploit comparative advantages. This was one of the main benefits of the family put forward by Becker (1981), which is based on the division of labor of the traditional family in which only the husband is engaged in the labor market, while the wife stays at home. With the generalization of married women's activity, this argument has obviously become irrelevant, even though, today, families continue to implement a weakened version of the comparative advantages in which women tend to invest more time in the family, while men invest more intensely in the labor market. An empirical result supporting this interpretation is the fact that married men tend to receive higher wages than single men with comparable characteristics (Waite, 1995), whereas the reverse is true for married women. However, as in the theory of international trade, if intra-family income transfers are taken into account, the division of labor in the household is a good generator of earnings for all family members, compared to the reference situation which would be for each of them singlehood.

- *The enjoyment of collective goods*; in economic terms, we can equate children with a collective good, first of all "produced" in the family, then shared by both parents. Another example of a property whose consumption is shared collectively by the members of the household is housing, but we can add many more, if we retain the usual definition of a collective good: a good whose consumption by the one of the partners does not reduce the one made by the other (non-rivalry in consumption).

The existence of collective goods, like the division of labor, contributes to increasing the benefits of family life. This is all the more true as the share of collective goods in family expenditure is high. Edward Lazear and Robert Michael (1980) estimate that two single people can almost double their purchasing power by entering into a relationship. In the same way, Couprie and Ferrant (2014) highlight a saving of time related to the life in couple.

- *Risk sharing*, the most representative ones are, of course, unemployment or sickness. It is true that with a health insurance and unemployment benefits, a single person can cope with these negative events of existence. But, on the one hand, these two types of insurance, widespread in France, are not everywhere and, on the other hand, the spouse's income contributes well to the family safety enjoyed by each individual in a relationship, even in countries where social security plays an important role. This appears well in the matching models on the marriage market.

2.1.5 Matching Models of marriage market.

Being married implies a loss of independence and breaking the marriage is not done without cost. If the marriage did not lead to these difficulties, everyone would marry the first person they met. Nevertheless, the choice of the spouse and the sharing of the gains of the marriage can be analyzed in terms of market. In the pairing literature, three main approaches are most often encountered. These three approaches are essentially distinguished by the existence or not of a transferable utility within a marriage. There is another one where we are in a situation without these two restrictions. Nevertheless, both are based on a concept of specific equilibrium known as "stability". Formally, an "assignment" is said to be stable if and only if: (i) There is no married person who would prefer to be single and (ii) There are no two married or unmarried persons who would prefer to form a new union (Weiss, 1994).

2.1.5.1 Stable matching with no transferable utility: the Gale-Shapley algorithm

In some cases, there is no good that the couple can transfer inside the marriage. There is no possibility of an exchange within a couple, but we can always change the couple. The balance is reached when there is no more rejected man. The main goal of Gale and Shapley is to define a matching mechanism that satisfies the requirements of stability: Gale and Shapley (1962) "In any marriage model, regardless of the preferences of individuals, there is a stable matching. Specifically, the matching resulting from the delayed acceptance algorithm, in favor of men, is stable (and similarly for the algorithm in favor of women) ".

2.1.5.2 Stable Pairing with Transferable Utility: The Becker-Shapley-Shubik Model

Individuals in society have several possible partners. This situation creates competition over the potential earnings of the marriage. The main interest of this approach is to emphasize that the decision to form a sustainable union is made by comparison with all the possible choices and not by the appreciation of the intrinsic merits of the chosen partner. This simplification is possible when there is a utility which, by changing hands, transfers utility from one partner to another at a fixed exchange rate.

In the two previous cases, the matching process is studied in specific and somewhat extreme contexts: either the transfers cannot take place, or they can be carried out at a constant exchange rate (so that reducing the utility of a member of a "unit" always increases also the utility of the spouse by a unit).

2.1.5.3 Matching with General Services

We now examine the general case in which, although transfers are feasible, there is no commodity that allows partners to transfer public services at a fixed exchange rate. Secondly, the limit of public services is no longer linear and it is impossible to summarize the marital exit of a correspondence by a single number. Mathematically, the matching model is no longer the equivalent of an optimization problem. Nevertheless, it is in principle possible to solve both the stable allocation and the associated distribution of the surplus ((Roth and Sotomayer (1990, chapter 6), Crawford (1991), Chiappori and Reny (2006) and Legros and Newman (2007).)).

2.2 Empirical aspects

In his study, RUTTO (2012), aimed at determining the effects of age-related demographic, socio-economic, socio-cultural factors on first marriage among previously married women in urban and rural Kenya. Data from the study comes from the Kenya Demographic and Health Survey (KDHS) 2008-2009. The study covers only 1697 and 4207 women aged from 15 to 49 already married respectively from urban and rural areas. The study used descriptive statistics and a Cox regression analysis.

The multi-varied results show that the effect of explanatory variables on age at first marriage differs between urban and rural women in Kenya. Age at first intercourse has a significant effect on age at first marriage among urban women but has no significant effect among rural women. The results show that education has a significant effect on the age at first marriage of rural and urban women. The results also indicate that there was a minimum difference in risk of contracting the first marriage between urban and rural women.

Similarly Kumchulesi et al. (2012) examined factors associated with early marriage in Malawi. The methodology is as follows: Malawi Demographic and Health Survey data for the years 2000 and 2004 was used, a one-variable model, a two-variable variable model with proportional risk were used. The results show that marriage in Malawi takes place earlier an the average age at first marriage is 17.4 years. Age, education, religion and ethnic group are important variables to explain age at marriage.

Palamuleni (2011) conducted a study to identify factors affecting marriage age among women in Malawi. This study used data obtained in 2000 and 2004 for the Malawi Demographic and Health Surveys. One-fold variable, two-fold variable and logistic regressions were used to examine the relationship between age at marriage and some background variables. Marriage in Malawi occurs early: almost 70% of women interviewed were married before the age of 18 and the average age at first marriage is 17.4 years. Age at marriage depends on age, region, rural / urban residence, religion, ethnic region and wealth. Early marriage and the resulting early pregnancies are linked to high fertility, the inferior status of women, and the health risks to the mother and child. The results of the logistic regressions indicate that age, region and education are the most important determiners of marriage age in Malawi.

Agaba et al. (2011) also analyzed the socio-economic determiners of youngers at first marriage for women in western Uganda using data from the 2006 Uganda Demographic and Health Survey.

Death-table technique was used to calculate the median age at marriage, the log- khi -square of log to test the equality of survival times and the proportional risk model to study the effect of various variables and to identify the extent and significance of their effects on age at first marriage. This study, which used data from 715 women aged 15 to 49 never married in western Uganda, found that the median age at marriage was 17.4 years. Education has a statistically significant delaying effect on women's age at first marriage. The district of residence has a significant effect on age at first marriage of women. The year of birth is significantly associated with the early age at first marriage of women. The profession has a significant effect on the risk of early marriage as well as the ethnic group.

Nasrin and Rahaman (2012) attempted to comprehensively analyze early marriage and woman's conception based on interviews with 609 previously married women from five slums in Rajshahi, Bangladesh. They tried to explain these two themes according to the different socio-economic conditions of the respondents. It appears that education is a statistically significant variable and high education reduces the risk of early marriage. The monthly income of the family negatively influences the risk of early marriage. Religion also has a statistically significant effect on an early age at marriage and conception.

For Nyamongo. (2000), the role of education in progress is widely recognized in many countries. However, the value given to formal education differs from community to community. In his article, he argues that among Borana pastors in Marsabit district, Kenya, the value of formal education is based on paid work opportunities. The high value given to women's housework and the low accessibility to non-household employment exerts a differential pressure on Borana children's education. This leads to a higher drop-out rate and earlier marriage for girls than boys.

For Gurmu and Etana (2014), the age at which women establish a marital union and give birth to the first child varies and causes a variation in demographic characteristics. Using the Ethiopian demographics and the Health Survey data, this study examined the determiners of the first birth interval. The analysis was performed using the Cox proportional hazard model and the Kaplan Meier chart based on data from 10,240 previously married women between the ages of 15 and 49 years. The result shows that the first early marriage, the low level of education and residence in the Amhara region positively influenced the number of births. It reveals that the moment of marriage and the first birth are partly governed by social factors and marital practices of the society although the factors of modernization have a role to play.

III. Data and research methodology

The purpose of this paper is to determine the explanatory factors of age at first marriage for women in Ivory Coast. To achieve this, we will expose in this part the analysis model and all related econometric techniques while specifying the source of our data.

3.1 The data

3.1.1 Data source

The data used in this study comes from the 2011-2012 DHS MICS. The third Demographic and Health Survey in Ivory Coast (EDSCI-III) combined with the Multiple Indicator Cluster Survey (MICS) was conducted by the Ministry of Health and AIDS Control (MSLS) in collaboration with the National Institute of Statistics (INS). The 2011 2012 EDS-MICS received the technical assistance of the world program of Demographic and Health Survey (Demographic and Health Surveys - MEASURE DHS) of International ICF. The objective was to collect, analyse and send demographic and health data relating particularly to fecondity, family planning, health and nutrition of mother and children, and HIV/AIDS.

The DHS involved the use of three basic questionnaires. Firstly, a household questionnaire to identify the permanent members of that household as well as visitors. One of the essential objectives of the Household Questionnaire was to identify eligible women and men for individual interviews. Secondly, the individual woman questionnaire was conducted to document information about eligible women. In the 9,686 households surveyed, 10,848 women aged 15-49 (women of childbearing age) were identified as eligible for the individual survey, and for 10,060 of them, the interview was conducted successfully, i.e a response rate of 93%.

Finally, the survey concerning men was conducted in one out of two households : 5 677 men were eligible and 5 135 were interviewed (reponse rate is 91 %) .

Our analyzes in this document are based solely on data from the individual women's questionnaire.

3.2 The variables studied and their methods of measurement

3.2.1 Dependent variable

- ✓ **Age at first marriage**

The dependent variable is age at first marriage measured in simple years. The age at the beginning of the marriage is the survival time of a state where one lives alone in the state of couple (free union or customary marriage, legal or religious).

The marital status of an individual is his or her position in relation to the marriage or union, at a given date. The individual may be single, in union, divorced or widowed. As part of the 2011-2012 DHS-MICS, the term "union" applies to all men and women who have declared themselves married or living with another person of the opposite sex[3]. This category therefore includes marriages established according to the law (marriages in civil status or legal marriages), religious marriages, those established according to other cultural norms of society (traditional marriage), but also free unions.

Women who break union are widows and those who are separated or divorced. Finally, women who are neither in union nor in break-up, as defined above, were considered single. The same definitions were adopted for men.

3.2.2 Independent variables

This study examined 7 independent variables. These variables include birth cohort, religion, area of residence (urban or rural), level of education, region, ethnic group, well-being index, and employment status.

[3] In our study, we do not consider homosexual unions because they are not recognized by law in Ivory Coast.

Well-being index

The economic well-being index is constructed using data on dwelling characteristics and household holdings, using a principal component analysis. The index is built in three stages by the Ministry of Health and AIDS contral in collaboration with the National Institute of Statistics (INS) and with the financial support of ICF International:

- ✓ In the first stage, a subset of properties or characteristics common to both urban and rural areas is used to create wealth scores for households in these two domains. Any modality of a qualitative variable of this subset is transformed into a dichotomous variable (0 or 1). A principal component analysis is performed with all the variables (dichotomous or not) of the subset to generate a common weight (score or coefficient) for each household.
- ✓ In a second step, separate weights (score or coefficient) are produced for urban and rural households using indicators specific to each environment.
- ✓ The third step combines the common scores and environment-specific scores to produce a national well-being index using a regression on common factor scores. The resulting scores are standardized according to a standard normal distribution of mean 0 and standard deviation 1 (Gwatkin and al.¬ 2000). Each household is assigned a score for each property and the sum of all scores per household.

This three-step procedure allows for greater adaptability of the welfare index to urban and rural areas. The score of a household is assigned to all its members and the population is then subdivided into quintile (five categories of equal membership if the population is ranked in ascending order of score). This establishes a scale ranging from 1 (poorest quintile) to 5 (richest quintile).

Employment status

Women were asked questions relating to employment. Being considered as having a job or a job, the women who reported having had a paid or unpaid activity during the 12 months preceding the survey, regardless of the sector of activity. The remuneration is in money and /or in goods or sometimes without remuneration.

The level of education corresponds to the highest level of education attained whether or not it has been completed. The variables used in this study are those frequently used for the analysis of age at first marriage. All independent variables were obtained from the interviewee's basic characteristics.

3.3 The model

The proportional risk model (Cox) is used to assess the effect of demographic, socio-economic and socio-cultural factors on the duration of marriage. The model was developed by Cox in 1972; Our sample includes all married and unmarried women between the ages of 15 and 49 years.

The risk model is appropriate for the analysis because the age at marriage measures the length of time (duration) until the occurrence of the event (getting married), so it explains women who did not yet know the events resulting from the right censorship of the data.

The model is generally described as follows:

$h(t;X_{1\ldots..}X_n) = h_0(t) \exp(b_1 x_1 + \ldots.. + b_n x_n)$ where h (...) stands for resulting risk,

$x_1\, x_2, \ldots\ldots x_n$ = n covariable for the respective case, x1, x2 are the explanatory variables of the study.

And t = age at first marriage

The term h0 (t) is called the reference risk function; This is the danger for the individual concerned when the values of all covariates are equal to zero.

HR Proportional Hazard or Hazard Ratio

The proportional risk (HR) for a variable X (i) is the ratio of two instantaneous risks for a change of a unit (or category) of X(i) while keeping the other variables X ($j \neq i$) constant.

$$h(t, X_1 = 1, X_{j\neq i} = cst) = h_0(t) \times e^{\beta_1 \times 1} \times e^{\beta_2 X_2} \times \ldots \times e^{\beta_k X_k}$$

$$h(t, X_1 = 2, X_{j\neq i} = cst) = h_0(t) \times e^{\beta_1 \times 2} \times e^{\beta_2 X_2} \times \ldots \times e^{\beta_k X_k}$$

$$\text{HR} = \frac{h_0(t) \times e^{\beta_1 \times 2} \times e^{\beta_2 X_2} \times \ldots \times e^{\beta_k X_k}}{h_0(t) \times e^{\beta_1 \times 1} \times e^{\beta_2 X_2} \times \ldots. \times e^{\beta_k X_k}} = e^{\beta_1 \times (2-1)} = e^{\beta_1}$$

Interpretation of HR for a variable X_i :

HR= $e^{\beta_i} \geq 1$

$\beta_i = 0 \Rightarrow$HR = 1: No effect of the variable *Xi* on the global risk h
$\beta_i > 0 \Rightarrow$HR >1: Increase in global risk, h is related to variable X_i
$\beta_i < 0 \Rightarrow$HR <1: Reduction of the global risk, h is linked to the variable X_i

We present the results in the form of risk ratios, which represent the relative probability of a woman with the specific characteristic of getting married compared to a woman who would be in the appropriate reference group. The risk ratio of the group or reference category is one (1.00). If the risk ratio of a given category is greater than 1.00, this indicates a higher risk of getting married at a younger age, and when the risk ratio is less than 1.00, it indicates a lower risk of getting married younger compared to the reference group. In this analysis, a variable will be reported as having a significant effect, if its effect on the marriage calendar is statistically significant at least at the 10% level of significance.

IV. Results And Implications Of Economic Policies

4.1 Descriptive statistics results

The results appear in Table 4.1 below.

4.1.1 Education

Women with no education or primary education were among the youngest to get married compared to those with secondary and higher education. The average age at first marriage varied from a low value of 18.1 among women without education. 19.3 years among women with a primary level of education, 20.6 years for those having a secondary level of education and 23.6 years for higher level of education. Age difference at first marriage compared to lack of education and to those with the highest level is 5.5 years.

4.1.2 Region of residence

The average age at first marriage is lower in the North-West region (17.3 years) followed by the North region (17.4 years). The highest ones are in the South regions of Abidjan and Abidjan (20 years). In general, Southern women without Abidjan (20 years) and Abidjan (20 years) marry later than women in the Northwest (17.3) and North (17.4) regions.

4.1.3 Area of residence

Urban women married later than those in rural areas. The average age at first marriage was 19.5 years in urban areas and 18.1 years in rural areas.

4.1.4 Religion

The average age at first marriage varies by religious affiliation. The average age at first marriage was lower among women who are animists (17.6), then without religion (17.9 years), Muslims (18.1), Methodists (18.9 years), other Christians (19.1 years), Evangelic Christians (19.4 years).), other Christian groups (19.6 years). The highest rate is among Catholics (19.9 years). It is interesting to note that the age at first marriage of Muslim women is slightly lower than that of Methodist women. The latter have a lower average age than Catholic women. These results support the findings of previous studies that found differences in average marriage age for various religious groups (Adedokun, 1999).

4.1.5 Household wealth index

Very poor women, the poor and moderately poor tend to marry earlier than rich and wealthy people. Women from very poor households marry on average at 18.2 years and those from very rich households marry on average at 20.3 years. The results of this study are similar to previous studies that found that economically disadvantaged families had the tendency to marry earlier than advantaged families (South and Crowder 2000, Snyder et al. 2004).

4.1.6 Employment

The results of this study show that women classified as employed have their average age at first marriage higher than those who are unemployed. Employed women marry 1.4 years later than those who are unemployed.

4.1.7 Ethnic group

The average age at first marriage varies by ethnic group. The average age at first marriage is lower among the Gur (18.2 years), then the Mande group (North and South (18.3 years)), Kru (18.8 years) and the Akan (19.9 years). The Gur marry earlier than the Akan and the gap between the two ethnic groups is 1.7 years.

Table 4.1: Average age at first marriage of women depending on basic variables for Ivory Coast in 2012

	Average	**SE**	**population**	**%**
Education				
no education	18.1	6.1	4771	67.1
Basic education	19.3	12.4	1570	22.1
Grammar school	20.6	19.5	677	9.5
Higher education	23.6	45.7	93	1.3
Region				
Centre	19.2	22.4	495	6.9
East Centre	19.0	18.4	582	8.2
North Centre	19.9	19.3	673	9.4
West Centre	18.2	16.8	657	9.2
North	17.4	14.3	667	9.3
Northeast	19	20.1	522	7.3
Northwest	17.3	11.9	956	13.4
West	18.0	16.1	655	9.2
South without Abidjan	20.0	24.2	485	6.8
Southwest	18.6	17.3	627	8.8
Abidjan	20.0	17.9	792	11.1
Area of residence				
Urban	19.5	9.7	2658	37.4
Rural	18.1	6.3	4453	62.6
Wealth index				
Very poor	18.2	11.6	1483	20.9
Poor	18.4	11.1	1487	20.9
Less poor	18.1	10.8	1545	21.7
Rich	18.6	12.2	1388	19.5
Very rich	20.3	14.7	1208	17
Employment status				
jobless	18.4	10.1	1835	25.8
Employee	19.0	6.4	5260	74.1
Religion				
Musulims	18.1	7.2	3272	46.1
Catholics	19.9	14.6	1204	16.9
Methodists	18.9	41.3	142	2
Evangelical religion	19.4	14.9	1084	15.2
Other Christians	19.1	31.5	252	3.5
Animist	17.6	28.4	269	7.9
No religion	17.9	14.9	797	11.2
Other religions	19.6	64.4	75	1
Ethnic groups				
Akan	19.9	12.1	1880	33.7
Kru	18.8	20.0	523	9.3
North Mande	18.3	12.7	1210	21.7
South Mande	18.3	18.5	580	10.4
Gur	18.2	11.7	1376	24.7
Total	18.6		7111	100

Source : Realized by the author from EDS MICS 2011-2012 data.

4.2 Results of the econometric estimation

Table of results with coefficient

VARIABLES	**B**	**SE**	**P-Value**	**EXP(B) Hazard Ratio**
Education				
Higher education (RV)	0,000		0,000	1,000
No ducation	0,495	0,116	0,000***	1,640
Primary education	0,373	0,116	0,001***	1,452
Secondary education	0,252	0,117	0,032**	1,285
Region				
Abidjan (RV)	0,000		0,000	1,000
Centre	-0,085	0,071	0,234	0,919
East Centre	-0,056	0,071	0,434	0,946

North Centre	-0,191	0,064	0,003***	0,826
West Centre	0,030	0,071	0,668	1,031
North	0,192	0,070	0,006***	1,212
East North	0,013	0,070	0,858	1,013
North-west	0,247	0,067	0,000***	1,280
West	0,103	0,072	0,151	1,109
South without Abidjan	-0,119	0,071	0,095*	0,888
South-west	-0,064	0,075	0,391	0,938
Area of residence				
Rural(RV)	0,000		0,000	1,000
Urban	-0,128	0,046	0,005***	0,880
Religion				
Others (RV)	0,000		0,000	1,000
Muslims	-0,166	0,052	0,001***	0,847
Catholic Christians	0,082	0,100	0,410	1,086
Methodists	-0,084	0,054	0,123	0,919
Evangelic Christians	-0,101	0,080	0,209	0,904
Other Christians	0,118	0,074	0,114	1,125
Animists	0,014	0,055	0,804	1,014
no religion	-0,159	0,127	0,210	0,853
ethnic Group				
Gur (RV)	0,000		0,000	1,000
Akan	-0,142	0,048	0,003***	0,867
Kru	0,028	0,066	0,673	1,028
North Mande	-0,112	0,050	0,024**	0,894
South Mande	-0,003	0,063	0,960	0,997
Wealth index				
Very rich (RV)	0,000		0,000	1,000
very poor	0,128	0,065	0,490	1,136
Poor	0,148	0,062	0,017**	1,159
lightly poor	0,144	0,054	0,008***	1,155
Rich	0,138	0,049	0,005***	1,148
Employment Status				
Jobless (RV)	0,000		0,000	1,000
workers	0,079	0,032	0,013**	1,082

Source: Realized by the author from EDS MICS 2011-2012 data.
Notes: * indicates that the coefficient is significant at risk of 10%, ** indicates that the coefficient is significant at risk of 5% and *** indicates that the coefficient is significant at risk of 1%.
VR: Referential Variable

4.2.1 Interpretation of results

Education

Education has four variables namely no education, basic and secondary education and university education. The reference variable is "university". We expect education to reduce the risk of early marriage. The finding is that the risk of early marriage decreases with the increase in the level of education of the woman as hoped. Compared with the woman of a university education level, the uneducated woman is at risk of contracting an early marriage by 49%, then the woman with basic level of education is 37.3%. Finally, the woman with secondary level of education is 25.2%. Thus, the uneducated woman is the most exposed to early marriage, followed by the woman with basic educational level and the one of secondary education level.

These results can be explained by the fact that women who go to school are more concerned about their school education, which increases the waiting time to find a better partner and obtain well-paying jobs.These results provide empirical evidence that a woman's level of education is an important determiner of women's age at first marriage in Ivory Coast. Higher education leads to a delay in marriage and therefore higher levels are associated with a lower probability of early marriage. Each additional level of education significantly reduces the likelihood of early marriage.

These results are confirmed by those previously reported in the literature (Rutto 2012, Kumchulesi et al 2012). The results obtained clearly show that education has a statistically significant and very influential effect on early marriage.

Region

The region is represented by eleven variables which are: Center, East Center, North Center, West Center, North, North East, Northwest, West, South without Abidjan, Southwest and Abidjan regions. Abidjan region is the reference variable. Estimates indicate a significant negative effect for the North Centre region and significant positive effects in the North and Northwest regions compared to Abidjan region. The risk of early marriage is therefore lower for the North-Centre region (-19.1%) and the South without Abidjan (-11.9%) and

higher for the North (19.2%) and North-West (24.7%) regions. This means that in the North-Centre region the South without Abidjan, it is less risky for women to enter into early marriage than those of Abidjan region, which is contrary for the North and North-West regions.

The higher risk of early marriage in the North and North-west could be justified by the weight of the tradition. In those regions, women are devoted to household chores and are therefore led to earlier marriage.

It should be noted that the risk of early marriage for women in Centre, Centre- East, Centre-West, North East, West and South-West regions is not statistically different from that of women of Abidjan region.

Area of residence

The area of residence is represented by two variables, urban and rural. The rural area is the reference variable. Estimates show a negative and statistically significant effect for the urban area. This means that the risk of early marriage for women living in urban areas in Ivory Coast is lower than the one of women living in rural areas. The risk is -12.8% compared to that of the rural area. This can be explained by the level of education of women in rural areas. In rural areas, women are generally uneducated or have primary education and hardly attain secondary education. However, it is shown that the lower the level of education of women, the higher the risk of contracting early marriage (Rutto, 2012 ; Kumchulesi et al. 2012)..

These results confirm previous studies that state that the highest rates of early marriage are in rural areas (Mc Laughlin et al., 1993, Westoff 2003, Garenne 2004).

Religion

The variables that are used to represent religion are: Muslim, Catholic, Methodist, Evangelical Christians and other Christians, animists, no religion and others. The Muslim variable is the reference variable. The results show that contrary to Muslim women, the Catholic Christian religion woman has a low risk of contracting an early marriage. The risk of early marriage for a Catholic woman is lower (about -16.6%) compared to that of the Muslim woman. Only the Catholic variable has a statistically significant result, the other variables do not have significant results.

Muslim populations originate from the North (North, North-West and Northeast). In these areas, women and girls are far less valued than men and boys, and often do not have a say in decisions that affect them or have an impact on their communities. Therefore, they also lack confidence and knowledge to access to the few basic services available at local and national level. The parents prefer to educate the boys. The girl is doomed to housework and can only wait for the wedding date set by her parents. Usually, she is married very early. Catholics are mostly scattered in the other regions of Ivory Coast. Although in some areas like those of the West you can also find places where the young boy is preferred to the girl when it comes to schooling. The fact that the Catholic Christian religion was hanged in most of the Ivory Coast and especially in the South made statistically lower the risk of early marriage for the Catholic woman compared to the Muslim woman.

Ethnic group

In Ivory Coast, there are four ethnic groups namely Gur, Akan, Kru and Mande. The most common distinction is made between the Northern Mande and the southern Mande. This study takes into account this distinction, so we consider five ethnic groups instead of four as variables in the study. The Gur variable is taken as the reference variables. Results show that only Akan and Northern Mande variables have significant results. So when you are an Akan or Northern Mande woman, it is less risky to get married early compared to the Gur woman. These low comparative risks are -14.2% for the Akan woman and -11.2% for the north Mande woman.

Akan people are located in its great diversity in the Centre, in the East and South. In those regions it can be seen that considerable efforts have been made to reduce the weight of tradition by the schooling of girls. Those regions are also highly urbanized; all things that help reduce the risk of the Akan woman to contract an early marriage compared to the Gur woman. The Gur and the Northern Mande are ethnic groups located in the great north of Ivory Coast. Northern Mande originate precisely from the Northwest when the Gur extend throughout the rest of the great North. The results found show that despite the weight of the tradition mentioned above, the Northern Mande stand out in the great North with a low risk of contracting an early marriage.

Wealth index

The variables designated as indexes of wealth are: very rich, rich, slightly poor, poor and very poor. Very rich is taken as the reference variable. According to estimates, apart from *very poor* variable, all other variables have statistically significant results. It is also noticed that the risk of early marriage decreases with wealth. So, poor women marry earlier than those who are slightly poor. Similarly, slightly poor women marry earlier than rich women who in turn marry earlier than very wealthy women. The risks of contracting an early marriage compared to the very wealthy woman is 13.8% for the wealthy woman, 14.4% for the slightly poor woman, 14.8% for the poor woman.

Several intercultural studies conducted in America have shown that people from economically disadvantaged families tend to get married earlier than those from favored families (South and Crowder, 2000; Snyder et al., 2004).

The social and economic conditions of the parental home have an impact on the likelihood of marriage of young women (Axinn and Thornton, 1992) and the economic independence of women, as well as the economic status of the family, have a significant effect on the age at which women marry (Quisumbing and Hallman, 2003).

Employment status

The employment status is represented by two variables that are employment and unemployment. The employment variable is taken as the reference variable. The results of the estimates show that the risk of early marriage is high for the woman who is unemployed. This risk is 7.9% compared to that of a woman who has a job. The estimates show that the occupation of girls affects the age at marriage.

Proponents of the "new theory of the domestic economy" assume that the increasing economic independence of women largely explains the increase in the number of delayed marriages (Blossfeld, 1995). Singh and Samara (1996) considered the participation of women in the workforce as one of the three main factors (the acquisition of formal education by women and urbanization being the other two) affecting age at first marriage.

V. Conclusion And Recommendations

The age at first marriage of women is a worrying situation in Ivory Coast. The marriage of children, especially girls, deprives them not only of their childhood but also of their right to education. It limits their possibilities of economic independence and leads to multiple and frequent pregnancies that endanger their health and that of their children. According to the 2011-2012 DHS MICS, although the law sets the minimum age of marriage at 18 for women, 12% were already in a union before reaching 15 years old and 36% were before 18 years old.

Our study of the determiners of age at first marriage was designed to determine the explanatory factors for early marriage in Ivory Coast. We used data from the 2011-2012 DHS MICS with a sample of 10,060 women. We analyzed the results from the proportional risk model of Cox.

Our results show that the risk of early marriage for Ivorian women decreases as the level of education and wealth increase.

Moreover, the results state that the risk of early marriage is higher for unemployed women. The risk of contracting an early marriage is low for women living in urban areas. This situation is observed from women living in the region of Abidjan and the South excluding Abidjan.

Catholic women and Akan women are the ones who have the lowest risk of earlier marriages.

The recommendations below are based on our results:

Recommendations for policies

The results of this study suggest that increasing the level of education reduces the risk of early marriage. It is therefore important to continue to improve educational policies. The latter must target girls and young women to enable them to acquire at least one level of post-secondary education. This will help empower women and make their participation in the economy market possible.

Recommendations for programs

It is therefore advisable to orient policies towards young girls, especially those who have no or little education. They should be trained on reproductive health and given basic skills to enable them to avoid early pregnancies. These programs should include girls of primary school and should focus on health as well as the economic benefits of delaying marriage and giving birth. This should be done throughout Ivory Coast with a focus on the least developed parts of the country that have a high risk of early marriage. Finally, from a demographic point of view, still, Ivory Coast has to reduce its fertility rate to "manageable levels". One way to do this is to increase the age at first marriage. Because a rapid population growth has a negative impact on economic growth.

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