# Fertility Decline in Chile: Changes in the Role of Education and the Age at The First Birth

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## Abstract

The fertility decline in Latin American countries started on it later but following rapid rates. The case of Chile is interesting because of its fast declines since the rates fell by 50% during the 1960s. Currently, the average number of children per women is below the replacement level. Using a completed fertility approach this research studies the decline of fertility in Chile during the 20th century looking at the completed fertility patterns of women cohorts born after the decline started (between 1935 and 1969). Specifically, it focuses on changes in the role of women's educational level and the age at the first birth. Based on count data analysis the results show differences between older and younger generations. The completed fertility is higher associated with education levels in older cohorts than in younger. In contrast, the age at the first birth follows an inverse pattern. Results are significant and stable across specifications.

## Introduction

During the second half of the 20th century the persistent decline in fertility rates to below replacement levels forged the theory of a Second Transition (SDT) (Lesthaeghe & Van de Kaa, 1986). The postponement of motherhood, expansion of cohabitation levels and extramarital births were rendered as explanations (Lesthaeghe, 2010). In addition to individual preferences, institutional and normative contexts (for example, gender equity) have acquired a prominent place in explaining the SDT (McDonald, 2006, 2000).

Nevertheless, it is unclear the feasibility of these theories across societies. In fact, it is possible to find exceptions to the mechanisms driven the fertility decline. Moreover, similar countries have shown different fertility trends (Balbo et al., 2013). Additionally, and at the individual level, education, occupation, and childbearing would be joint decisions, making difficult to assess the causality between these factors and fertility (Steele et al., 2005; Wood et al., 2014).

The Latin American (LAC) region defies the traditional transitional theories because mortality rates decreased dramatically before modernization. Moreover, the declining on fertility in countries like Chile and Mexico happened after an increase in fertility rates (in the 1950s) and during the rise or marital status (McCaa, 1983). In addition, the LAC`s fertility transition challenges the idea that pre-transitional societies lacked family planning (Mason, 1997; McCaa, 1983).

This research seeks to disentangle the changes on fertility decline in Chile, a country where the average number of children per women fell from 5.4 in 1950 to 1.9 in 2018 (INE, 2008). Specifically, it centers in the patterns of completed fertility over the 20th century with

focus on two dimensions: the socioeconomic domain (women's education levels) and age at first childbirth. The general hypothesis is that there is a relation between completed fertility patterns and the fertility decline in Chile, nevertheless the changes on completed fertility have been heterogeneous across time. Specifically, how have completed fertility patterns changed over time in Chile, for younger and older birth cohorts, and how much variation is there by education level and the age at first childbirth?

## Literature review

The declining fertility in LAC has been heterogeneous; broadly, countries started the process after European and North American societies and from higher fertility levels. Mexico and Brazil started to experience a decline in the 1960-70s, while Colombia, the Dominican Republic, Venezuela and Chile followed the trend a couple of decades later. The exceptions are Argentina and Uruguay, where the decline began earlier, in late 19th century (Chesnais, 1992). The region stands out for larger changes in fertility over recent decades (UN, 2013). Indeed, countries, such as Brazil, Chile, Uruguay and Costa Rica have already fallen below replacement fertility rates (Salinas, 2011). However, explanatory factors mentioned above for the SDT are not evident in the region. For example, delayed motherhood it has not observed among Latin American countries (Esteve Palós et al., 2013).

Women's education maintains a complex relationship with the decline in fertility, since higher education levels predict a delay in marriage and better knowledge of contraceptive methods (smaller family size), but at the same time more resources for care children (Martine, 1996). Caldwell (1976) argues that education plays the main role in declining fertility rates in developing countries, observable for most educated women from the second generation. Another perspective points out the role of education in different stages of the SDT. Thus, highest-

educated women start the decline in fertility (leader-follower model) and even during the transition the education differentials persist at the end, all groups see their fertility rates decline (permanent difference model) (Bongaarts, 2003). This model highlights that differences are larger at the beginning of the transition and the gaps get smaller but remain at the end (Rodriguez et. al, 2014).

Some authors indicate that the increase in education level drove the fertility decline in Latin America (LAC) after 1935-39 because of a highly dissimilar behavior regarding contraception among women (Martin & Juarez, 1995; Reher & Requena, 2014). For others, education levels have not been found to be related with declines in marital unions or teenage motherhood. Thus, more educated women do not marry later than less educated ones (Esteve Palós et al., 2013). In addition, the Latin American transition contradicts the underlying assumption that differentials in fertility caused by education disappear when the transition reaches the replacement levels. The involvement of women in the job market is another expected mechanism through which education influences fertility (Rodriguez et. al, 2014). Nonetheless, in LAC even though education levels have increase, women's labor participation has not.

Evidence for Brazil confirms the negative relation between completed fertility and education levels since the birth cohort of 1940. Nevertheless, the primary mechanism is not clear, since the association between higher educated women with delayed marriage, and labor participation is not clear (Martine, 1996). Birth control - abortion and sterilization during the 60's and early 70's - provides with a better mechanism to explain the sharp decline in fertility in the country (Martine, 1996).

Teenager motherhood is widespread across the region, the proportion of women who became mothers before the age at 20 and is 30%. Indeed, whereas having a second child is

increasingly rare among young Latin American women, the age at first childbirth has remained stable over the last two decades. In general, causes are early sexual initiation and insufficient access to contraception or abortion (Rodriguez et. al, 2014). This has implications for the fertility decline, since an early age at first childbirth is related to more children at the end of productive years due a longer risk of pregnancy (Kohler et al., 2001).

Chile fits well with the general trends described for LAC but stands for being one of the few countries in the region with fertility rates below replacement level. Regarding classical SDT factors, more children are born outside marriage increasingly currently over half of all Chilean children are born to unmarried mothers (Larrañaga, 2006; Salinas, 2011). Regarding postponement of motherhood, a bimodal or roughly bimodal pattern has been observed, characterized by two peaks of first childbearing age, before the age at 20 and around 28 years. The positive and significant relation between these "peaks" and women's education, labor participation, and marital status suggests the existence of a high stratified fertility structure (Lima et. al, 2015). The proportion of childless Chilean women is the second lowest among OCDE countries. Indeed, it is one of the cases where the rate has been falling through over time (7.2% for women between 40-44 in 2002) (OCDE, 2015).

*Completed fertility and cohort approach*

Completed fertility is the number of children born per woman to a cohort of women by the end of their childbearing years (Population Reference Bureau). Because period fertility rates are sensitive to postponement of motherhood, measuring the number of children born to women over 40 years of age is suitable to study the decline (UN, 2013). Two fertility features make the completed fertility analysis a preferred method for this study. First, it is influenced by macro level opportunity structures (socioeconomic, policy, cultural and demographic characteristics),

and by individual circumstances like transition deadlines (timings in starting work, marrying, and biological aspects) (Hagestad & Call, 2007). This thoughtful approach provides useful insights to compare trends by country in declining fertility rates. Indeed, countries with similar levels of total fertility demonstrates different completed fertility patterns. For instance, whereas in Eastern Europe three or more children and childlessness are rare at the end of childbearing years; in Northern and Western Europe, both are more common. Also, countries that made a more recent transition to below-replacement fertility rates have higher percentages of women aged 40-44 years with three or more children, but low childlessness (UN, 2013). Hence, completed fertility analysis has been useful to explain phenomenon such as the baby boom in the 60s in the USA (Kenny, 1978).

The cohort approach is another dimension of research on fertility process. Some authors disregard its utility as an observation unit for fertility decline because assumes causality between factors. Time scale has been criticized by pointing out that small sample sizes, like decades, are less reliable for study the fertility decline (Mason, 1997). For this reason, cohort research approach is used here for descriptive analysis but not for the multivariate one, for which a fertility period based on two groups is used.

In sum, even though there is plenty of research and evidence on fertility trends in LAC, less is known about the changes on completed fertility patterns and its implications for the fast fertility decline in the country. This study analyses eleven cohorts of Chilean women looking for changes in the association between education and age at the first birth, and the completed fertility.

## Data and methods

*Data*

Two datasets are used for the analysis: census data from the years 1982, 1992 and 2002[1] and Socio-Economic Characterization Survey (CASEN) from 2013. Selecting women between 43 and 77 years of age at the time of the census it analyses data on completed fertility from eleven cohorts: 1905-9, 1910-14, 1915-19, 1920-24, 1925-29, 1930-34, 1935-39, 1940-44, 1945-49, 1950-54 and 1955-59. When cohorts overlap, the older information is preferred due the higher proportion of women. By census year, cohorts from 1905 to 1939 represent the 43% of the total sample, 24% are from 1940 to 1949, and 33% born between 1950 and 1955. The final dataset includes 2,703,168 women.

The CASEN is the most important Chilean household survey representative for both the urban and rural populations. The Ministry of Social Development has been implementing it biannually, or every third year, since 1985 and it is freely available for research[2] the reporting units are household members. The CASEN is a complex data survey; the sample of households is obtained probabilistically, is stratified, clustered and uses multiple-stage methods. Finally, because CASEN supposes a stratified sampling, to obtain correct and stable variance per variable, two parameters (*varstrat* and *varunit*) are used. These identify pseudo-strata and

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1 The three have been obtain directly from the National Statistics Institute (INE, its acronym in Spanish)

2 Data has been downloaded from the Minister`s webpage(http://observatorio.ministeriodesarrollosocial.gob.cl)

pseudo-conglomerates, respectively, allowing variance problems to be corrected when only one PSU was selected in some specific strata (Minister of Social Development, 2013). From this database it considers the subset of women over 43 and below 78 years of age at the time of the survey. Hence, it analyses the following women birth cohorts: 1935-39, 1940-44, 1945-49, 1950-54, 1955-59, 1960-64 and 1965-69.

*Variables*

The following census variables are used: birth cohort, total number of children born (completed fertility), highest education level (no education, primary, secondary or tertiary and upper tertiary education)[3]. From CASEN it takes the birth cohort, women's highest education level (no education, primary incomplete, primary complete, secondary incomplete, secondary or tertiary education), and the age at the first birth. From this sample, four subsamples are defined using two criteria: the older cohort (subsample 1) includes women born between 1935 and 1954 (43% of the subsample) and a younger group (subsample 2) consists in those born between 1955 and 1969. Subsamples 3 and 4 identified women with at least one child in each cohort. Cases with missing values in relevant variables were deleted from both CASEN and the census to estimate results for complete case analysis in each model.

Table 1 presents the distribution of each variable by subsample and the missing data proportion for all data. The average number of children for the older and younger cohorts is 3.27 and 2.57, respectively. These are slightly higher for Subsamples 3 and 4, since these do not

3 The 92% of the cases present information for the question on the total number of children born and 75% do so for the highest education level.

consider childless women. Childlessness represents the 7% and 5% of the younger and older cohorts, respectively. Also, whereas 30% of older group have one or two children at the end of their fertility age, 48% of the younger women pertains to this group. For both cohorts 41% of women are in the category of three or four children. The great difference between groups is observed on the last category, five or more children, since the 21% of older and the 7% of younger women belong to it. The mean age at the first birth is 22.53 for the older and 22.25 for younger cohorts, with a standard deviation near 5.5, indicating high variation on this variable. Then, a categorical variable based on age at the first birth quartile distribution, shows that women from the first quartile brought gave birth for the first time by the age at 18, between 19 and 21 years of age in the second, between the ages of 22 and 25 in the third, and over 26 years in the last. This highlights that that among younger generations there is a higher proportion of women in the second group in comparison with older cohorts (30% vs 25%).

[TABLE 1 HERE]

*Methods*

The analysis is divided into two main stages: descriptive and multivariate. Firstly, using census data, a descriptive analysis was conducted to assess trends on the average number of children by cohort. Mean and standard deviation of number of children are calculated by cohort. Secondly, multivariate models for count variables are run using CASEN information. Poisson, Negative binomial and zero-truncated Poisson models are used, all based on Poisson distribution (Long & Freese, 2014). This distribution has the property of the mean $\mu$ also being the variance (equidispersion) (Rodríguez, 2007; Long & Freese, 2014). The advantage to using models based on Poisson distribution instead of OLS, is that the latter assumes constant variance over different mean values (homoscedasticity). Poisson distribution is appropriate for the count-dependent

variable since it captures the fact that variance tends to increase with the mean ($\mu$) (Rodríguez, 2007). Indeed, as the mean of children increases (1.4 for women with less than three children and 5.1 for women with three or more) the variance also increases (0.6 and 2.9, for these groups). However, equidispersion is rare in count data, and overdispersion (conditional variance exceeds conditional mean) is likely (Rodríguez, 2007; Long & Freese, 2014). For the entire sample, the variance represents 1.19 times its mean (3.4 vs 2.8), thus providing evidence of overdispersion. Usually Poisson model underfits the standard deviation outcome for overdispersed variables, producing spuriously large *z*-values and small *p*-values (Long & Freese, 2014). For this reason, negative binomial regression (NBRM) is preferred for Subsamples 1 and 3 (older women). This model adds the parameter $\alpha$ to consider unobserved heterogeneity among observations; hence, it determines the degree of dispersion in the predictions. Finally, the dependent variable variance in younger Subsamples (2 and 4) is lower than mean, hence Poisson models are preferred for these data.

Equations 1 and 2 present models run for each case, where $\beta_0$ is the constant, $\beta_1$, $\beta_2$ and $\beta_3$ the coefficients for each covariate, and $\varepsilon_i$ is the error term for women i in NBRM, which it assumes to be uncorrelated with the covariates.

[Equation 1 HERE]

[Equation 2 HERE]

In order to address the question about the association between completed fertility and age at the first birth the number of children for subsamples 3 and 4 is truncated since the variable is not available for childless women. For this analysis, zero truncated models are preferred. In Poisson truncated models, the expected rate ($\mu_i$), conditional to $\chi_I$, increases proportionally to the

probability of a positive account. Because the exclusion of zero children, the conditional rate of number of children is larger than the unconditional rate (Long & Freese, 2014). Models run for subsamples 3 and 4, are equal to Equations 2 and 3, respectively, but adding the age at the first birth as covariate.

## Results

*General completed fertility trend across cohorts*

General trends of completed fertility clearly show the decline across the board for women born during the 20th century. Specifically, the total mean is 3.6 children; highest (4.6) and lowest (2.7) means are from the 1925-29 and 1950-59 cohorts, respectively. There are two groups. First, older groups, between 1905 and 1939, present means of over four children, with a standard deviation of over three points. Second, women born between 1940 and 1959 show a different pattern, with means of under four children and less dispersion than older generations. Indeed, both, average number of children and dispersion, decreased over these last four cohorts. Finally, the largest average number of children is observed in the groups between 1920 and 1934, just before the decline began.

To assess the potential role of women's education on changes in completed fertility, Graph 1 presents the average number of children across cohorts, contrasting six education levels. Two conclusions emerge from this graph. On the one hand, and irrespective the cohort, the average number of children is lower for women who reached higher levels of education. On the other hand, completed fertility means diminished for all education levels. The graph suggests that decline has a recognizable beginning. Accordingly, women born since 1935-39 had, on average, fewer children than older generations by the end of their fertile life. Simultaneously, in

these cohorts a trend of similar averages across education levels has been observed, suggesting a decline in the educational gradient noted for previous generations. Hence, the decline trend since this cohort followed different rates per educations levels. Specifically, it fell more for less educated women than for those higher educated.

Certainly, education levels changed radically during the period under analysis. For instance, uneducated women diminished from a quarter of the population in the oldest cohort to 10% in the 1930-34 cohort and 2% for the youngest. Inversely, the tertiary educated group improved from 1.3%, to 3%, and to the 20%, respectively, across these cohorts. Possibly, a compositional effect regarding completed fertility and education was behind the fertility decline in the country. But is the level of education significant and consistently related with completed fertility across cohorts, since the beginning of the decline? Is it possible to state that the association diminished for women from younger generations?

[GRAPH 1 HERE]

*Completed fertility and education*

Table 2 shows results for the models including women's education level, mother's education and their interactions. Models (1) to (3) correspond to older cohorts and models (4) to (6) to the younger groups. These have been estimated using Negative binomial regression and Poisson regression for older and younger groups, respectively. The reference categories are incomplete secondary education and primary education for women and mother's education covariates because represent a good point of comparison.

Results indicate that women's education has a significant relation with completed fertility in the expected direction for both groups, but with different magnitudes. Specifically, the

expected number of children increases by 70% and 35% for older and younger cohorts when non-educated category is compared with secondary incomplete level. On the other hand, the expected number of children decreases by 9.4% and by 12% for women with secondary education for the older and younger group, when compared to cases of incomplete secondary education. Finally, one of the largest associations is observed for older women who reached the tertiary level among older cohorts. They reduce the expected number of children by 27% compared to the reference category; the percentage is lower for the younger group (19%).

Mother's education has a less consistent relation with completed fertility, since not all the categories are significant, and the direction is erratic. However, women whose mothers have no education increases their expected number of children by 9.4% and 11% in each group when compared to cases of women with primary education. Thus, only for the older cohorts does having a mother with tertiary education decreases the expected number of children by 32% when compared to women with incomplete secondary education whose mothers have primary education. Also, the uneducated mother category lost its significance for both groups. By contrast, among the younger group the expected number of children diminishes for women without education and mothers with tertiary level, for those with secondary complete and mothers with secondary level, and for those with professional education and secondary educated mothers. In other words, there is a trend followed by women with equal or higher education level than their mothers, who surpass incomplete secondary education, decreasing their expected number of children in comparison to the reference group. These two groups represent 27% of the younger subsample.

[TABLE 2 HERE]

Even education level shows a strong association with completed fertility patterns involving changes over years; these can be the reflect of some underlying factor not accounted for in the models.

*Completed fertility and age at first birth*

Table 3 presents results for models for subsamples 3 and 4, adding the age at the first birth as covariate. The variable age at the first birth is significant for each specification in both subsamples; that means for all women's education level and mothers' education levels. One extra year decreases the expected number of children by 6.5% and 5.3% for the older and the younger group, respectively. Furthermore, five and ten additional years in the age at the first birth decreases the expected number of children by 29% and 49% in older, and by 23% and 40% in the younger generation. The coefficients decrease slightly when other covariates are considered (to 5.7% and to 5%, respectively).

Women's education level – models (2) and (6)- presents a less consistent association, contrasting with previous results. Specifically, there are no significant differences for women with completed secondary education compared to the incomplete secondary education group, nor is there for tertiary educated women from the younger group. Women with incomplete and complete primary education from older cohorts increase the expected number by 57%, 25% and 11%, respectively, compared to the group who reached incomplete secondary as their highest education level and holding constant the age at the first birth. All associations are significant at 0.01 and similar across the specifications. However the magnitude diminishes for the group without education (to 45%) in models with all the covariates. Also, the expected number of children decreases by 11% for the most educated group in model (5).

For the younger group, only the lower education levels are associated with the expected number of children. Specifically, the predicted number of children increases by 24% and 12%, respectively; in comparison with women with a secondary incomplete formation, and holding constant the age at the first birth.

Also mother's education level presents a new pattern. For older cohorts, the expected number of children increases by 7% for women with not educated mothers.

[TABLE 3 HERE]

The age at which women started motherhood plays a role in completed fertility patterns. This is a strong association, irrespective of women's highest education level and her mother's education. The relationship is similar for old and young cohorts. Second, the specific completed fertility patterns, for the younger women predicted probabilities are closer within the group. In other words, irrespective of the age at the first birth, and the expected outcome, predicted probabilities are more similar that the observed for older generations. Third, a dependent relation between education and age at the first birth it has been observed[4]. It seems that education level it is higher relates with completed fertility patterns among older cohorts (in comparison with the age at the first birth). In contrast, for the younger group, regardless of the educational level posponed the first birth is significatly associed with less children.

4 The models with the interaction term between education level and birth first age are not shown.

## Discussion

LAC is one of the regions with the fastest decline in fertility in the last decades, which makes it crucial to disentangle the patterns of this trend. Specifically, to understand the extent to which explanations of declining fertility, traditionally put forth for developed countries, are suitable to the region. This study advances in this task using the thoughtful approach of the completed fertility trends of Chilean women cohorts who started with the decline. Overall, the results confirm the association between completed fertility patterns and fertility decline for Chile. However, the richest findings of the present study are the differences in the dynamics that later generations follow.

Three primary conclusions derive from this research. Firstly, despite the decline in completed fertility that came in parallel with rising levels of education, the groups of less educated were the ones who showed a sharper decline in their number of children at the end of their fertile period. After that, generations of women followed different trends regarding the relation between completed fertility, education and age at the first birth. Secondly, while the older generations (born between 1939 and 1954) present a broad and strong relation with education levels (higher levels are associated with fewer children), younger cohorts (born between 1955 and 1969) have significant but lower associations. Thirdly, when completed fertility patterns are conditional to the age at the first childbirth, both groups show a consistent relationship. These are in the expected direction, since all women whose first childbirth after 18 years have fewer children than the ones who were teenager in their first birth. The effect rises gradually when motherhood starts later. But, for older women, education maintains its significance. In contrast, among younger women, the age at the first childbirth appears as more relevant.

Two findings prove that the age at the first birth is more relevant for the younger generation than it is for the former group. First, the significance and magnitude of education and the results observed for the interaction between the two variables. Second, the age at the first childbirth is prevalent across education levels for this last group, observable by the negative sign. These patterns suggest valuable insights for the study of declining fertility in Chile; specifically, regarding the consequences associated with education and teenage motherhood, and its changes over the time.

Regarding changes on fertility in Chile, the next (on going) step is include the women cohorts born between 1970 and 1975. In addition, it is important to include the structural and institutional context, among others affecting fertility decline in Chile in greater detail. For example, cultural factors and changes on fertility intentions have been less explored for Chile and Latin America. Also, more research about contraception methods is needed to better understand the role of education and the age at the first child. These will shed light on the causes of declining fertility in the region.

## Limitations

The models presented do not account for all the variance on completed fertility across time. Consequently, new questions emerge regarding the mechanism behind these relations and its future trends. Hence, it is important to assess the potential role played by other factors not considered here. Contraceptive methods and possibility dependent behaviors after the first childbirth experience. Including these variables, could improve the results from count models.

In addition, it is not possible to derive causal conclusions between the education level and age at the first birth and completed fertility patters. This problem could be address using

longitudinal data, since education level and births are interrelated events. A longitudinal approach allows to observe other factors such as employment and marital status at the time of the births.

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**Table 1 Sample characteristics**

| Variable | Sub sample 1 | Sub sample 2 | Sub sample 3 | Sub sample 4 | % Missing* |
|---|---|---|---|---|---|
| Mean of children | 3.27 | 2.57 | 3.64 | 2.84 | 1% |
| Standard deviation | 2.16 | 1.36 | 2.15 | 1.32 | |
| *% women per number of children* | | | | | |
| Childless | 7% | 5% | | | |
| One or two children | 30% | 48% | 31% | 44% | |
| Three or four | 41% | 41% | 44% | 47% | |
| Five or more | 21% | 7% | 25% | 9% | |
| *Mean of age at the first birth* | | | 22.53 | 22.25 | 2.5%** |
| Standard deviation | | | 5.64 | 5.46 | |
| *% women per age at first birth category* | | | | | |
| Between 10 and 18 | | | 24% | 25% | |
| Between 19 and 21 | | | 26% | 30% | |
| Between 22 and 25 | | | 26% | 23% | |
| Between 26 and 37 | | | 24% | 22% | |
| *Women Education level* | | | | | 1% |
| No education | 2% | 2% | 7% | 2% | |
| Primary incomplete | 23% | 23% | 29% | 23% | |
| Primary complete | 17% | 17% | 18% | 17% | |
| Secondary incomplete | 17% | 16% | 18% | 17% | |
| Secondary complete | 31% | 31% | 16% | 31% | |
| Tertiary (technical, professional, postgraduate) | 11% | 11% | 12% | 11% | |
| *Mother's education level* | | | | | 32% |

| | | | | | |
|---|---|---|---|---|---|
| No education | 30% | 23% | 31% | 23% | |
| Primary | 51% | 56% | 51% | 56% | |
| Secondary | 16% | 20% | 15% | 19% | |
| Tertiary (technical, professional, postgraduate) | 3% | 2% | 3% | 2% | |
| Observations | 10,912 | 16,265 | 7,907 | 7,327 | 40,199 |

Source: CASEN, 2013

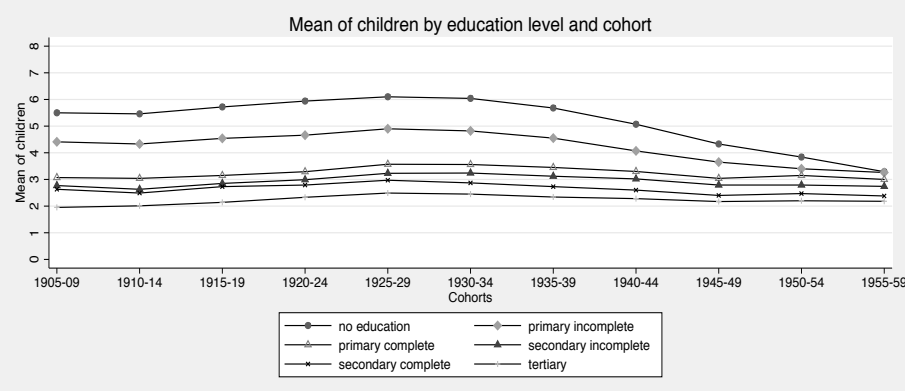
**Equation 1**

$$Log(Number\ of\ children)_i = \beta_0 + \beta_1 EducationLevel + \beta_2 Mother´sEducationLevel + \beta_3 EducationLevel * Mother´sEducationLevel + \varepsilon_i \quad (1)$$

**Equation 2**

$$Log(Number\ of\ children)_i = \beta_0 + \beta_1 EducationLevel + \beta_2 Mother´sEducationLevel + \beta_3 EducationLevel * Mother´sEducationLevel \quad (2)$$

**Graph 1**




Source: census 1982, 1992, 2002

**Table 2. Completed fertility women between 43 and 77 years: education level and mother's education level**

| VARIABLES | (1) Older | (2) Older | (3) Older | (4) Younger | (5) Younger | (6) Younger |
|---|---|---|---|---|---|---|
| Woman education (REF.: Secondary incomplete) | | | | | | |
| No education | 0.532*** | 0.467*** | 0.443*** | 0.300*** | 0.283*** | 0.350*** |
| | (0.0355) | (0.0393) | (0.0674) | (0.0466) | (0.0476) | (0.0578) |
| Primary incomplete | 0.260*** | 0.227*** | 0.216*** | 0.152*** | 0.144*** | 0.127*** |
| | (0.0290) | (0.0302) | (0.0433) | (0.0242) | (0.0244) | (0.0329) |
| Primary complete | 0.162*** | 0.142*** | 0.137*** | 0.0511** | 0.0473* | 0.0708** |
| | (0.0269) | (0.0269) | (0.0357) | (0.0241) | (0.0244) | (0.0308) |
| Secondary complete | -0.0992*** | -0.0911*** | -0.113*** | -0.123*** | -0.123*** | -0.104*** |
| | (0.0302) | (0.0314) | (0.0422) | (0.0216) | (0.0218) | (0.0281) |
| Tertiary education (technical, professional, postgraduate) | -0.309*** | -0.296*** | -0.282*** | -0.211*** | -0.224*** | -0.167*** |
| | (0.0533) | (0.0517) | (0.0501) | (0.0266) | (0.0265) | (0.0345) |
| Mother's education (REF: Primary education) | | | | | | |
| No education | | 0.102*** | 0.0671 | | 0.0506*** | 0.0686 |
| | | (0.0212) | (0.0524) | | (0.0179) | (0.0480) |
| Secondary education | | -0.0235 | 2.48e-05 | | 0.0400** | 0.110*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (0.0349) | (0.0563) | | (0.0192) | (0.0399) |
| Tertiary education (technical, professional, postgraduate) | | 0.0614 | -0.392*** | | 0.0694 | 0.211 |
| Women education*Mother's education (REF.: Secondary incomplete* Primary education) + | | | | | | |
| | | | (0.176) | | | (0.206) |
| Constant | 1.097*** | 1.082*** | 1.090*** | 0.984*** | 0.968*** | 0.952*** |
| | (0.0208) | (0.0223) | (0.0285) | (0.0192) | (0.0204) | (0.0252) |
| Observations | 10,912 | 10,912 | 10,912 | 16,265 | 16,265 | 16,265 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: CASEN, 2013

Note (+) : Coefficientes not in the table

**Table 3. Completed fertility women between 43 and 77 years: education level, mother's education level and age at the first birth**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *VARIABLES* | *Older* | *Older* | *Older* | *Younger* | *Younger* | *Younger* |
| *Age first birth* | -0.0673*** | -0.0583*** | -0.0583*** | -0.0543*** | -0.0510*** | -0.0509*** |
| | (0.00268) | (0.00262) | (0.00245) | (0.00403) | (0.00462) | (0.00459) |
| *Woman education (REF.: Secondary incomplete)* | | | | | | |
| *No education* | | 0.451*** | 0.405*** | | 0.213*** | 0.208*** |
| | | (0.0361) | (0.0368) | | (0.0677) | (0.0715) |
| Primary incomplete | | 0.224*** | 0.200*** | | 0.114*** | 0.113*** |
| | | (0.0305) | (0.0307) | | (0.0377) | (0.0410) |
| Primary complete | | 0.105*** | 0.0913** | | 0.0419 | 0.0423 |
| | | (0.0362) | (0.0363) | | (0.0436) | (0.0445) |
| Secondary complete | | -0.0350 | -0.0296 | | -0.0122 | -0.0130 |
| | | (0.0361) | (0.0366) | | (0.0365) | (0.0352) |
| Tertiary education | | -0.0604 | -0.0610 | | -0.00932 | -0.0295 |
| | | (0.0565) | (0.0484) | | (0.0776) | (0.0801) |
| Mother's education (REF: Primary education) | | | | | | |
| No education | | | 0.0684*** | | | 0.0152 |
| | | | (0.0211) | | | (0.0302) |
| Secondary education | | | -0.0337 | | | 0.0194 |
| | | | (0.0333) | | | (0.0267) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tertiary education | | | 0.123 | | | 0.133* |
| | | | (0.138) | | | (0.0769) |
| *Constant* | 2.706*** | 2.395*** | 2.387*** | 2.131*** | 2.023*** | 2.015*** |
| | (0.0562) | (0.0615) | (0.0604) | (0.0860) | (0.104) | (0.102) |
| *Subsample Observations* | 7,907 | 7,907 | 7,907 | 7,327 | 79,698 | 7,327 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: CASEN, 2013

Note(*): The models include interaction term between woman education and mother's education as covariate