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UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA  
DIPARTIMENTO  
DI SCIENZE  
STATISTICHE

## When money matters. The impact of the *bonus at birth* on reproductive behaviour in a lowest-low fertility context: Friuli-Venezia Giulia (Italy) from 1989 to 2005.

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**Keywords:** fertility, local policies, monetary incentives

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## 1 Introduction

There appears to be a general scepticism in the literature over whether public policies have an impact on choices concerning fertility. For instance, in a detailed overview of the influence that policies have on birth-rates, Gauthier (2001) stated that “Overall, thus, the multivariate studies provide mixed conclusions as to the effect of policies on demographic and economic behaviour, once other factors such as education, income, etc. are ‘controlled’ for. The effect – if any – tends moreover to be small. Methodological issues may be at the basis of these inconclusive findings...” (see also Gauthier, 2004).

On the other hand, previous work has shown that in Italy – from 1999 on – some monetary allowances aimed at poor couples with 3+ children aged <18 have significantly increased the parity progression ratio 2→3 for poor women, and have decreased the abortion ratio 2→3 for the same group (Billari et al., 2005). In the present paper, we further investigate this issue, employing a similar methodological and substantive approach. More specifically, we consider the North-eastern Italian region of Friuli-Venezia Giulia (FVG, pop. 1.2 million at the beginning of 2008), where although fertility has been extremely low over the last 30 years (TFR<1.5 from 1978 onward; TFR<1.2 from 1992-2003), there are some signs of recovery (TFR=1.3 in 2007). Since FVG is one of the six autonomous Italian regions – and as such has greater political and fiscal autonomy – the region has been able in developing strong family policies, reinforcing national legislation. As

described in the following section, in 2000-03 FVG implemented relatively rich monetary policies for couples with at least two children. In this paper, we investigate whether the *bonus given at birth* had a significant impact on reproductive choices in FVG during 2000-04. After a detailed description of monetary family policies in FVG over the last 15 years (part 2) we describe our data and methods (parts 3 and 4). In part 5 we present our main results. Part 6 is devoted to an overview of the results and their political relevance.

## 2 Regional monetary family policies in FVG: 1993-2007

It is possible to distinguish four phases in FVG's monetary family policies (see fig. 1).

**In a first phase (1.1.1993-31.12.1999)**, the maternity bonus was specifically aimed at unemployed women who did not already receive a maternity allowance from the State. The bonus (Regional Law (RL) n.24 of 24.6.1993) was given to children born from 1.7.1993 on. More specifically, a bonus of €516.46 (one million Italian lire) was given to each woman who: 1) had resided in the region for at least three months before the birth of the child 2) had a very low personal income (of less than €4,000 a year), and 3) received no other maternity allowance. This bonus increased to €774.69 for those children born from 27.8.1996 on. However, it was now required to have been resident of the region for at least five months. The bonus was again increased to €1,549.37 for those children born from 1.1.1999 on, and the residence requirement was raised to one year.

**In a second phase (1.1.2000-31.12.2003)** the bonus was reorganized on the basis of an explicit demographic purpose. The RL n.2 of 22.2.2000 stated that the aim of the bonus was to *boost population growth in the region*. The bonus also differentiated between married and unmarried women. Beginning with those children born on 1.1.2000, the existing bonus of €1,549.37 was maintained for first order births. The requisites of the mother remained those described above, but the income limit was fixed at €25,822.84. For second and higher order births, the bonus was granted only to married couples who: had resided in the region for at least one year, had at least one partner with Italian citizenship, and had an income lower than €46,481.12. The amount of this new bonus was €3,098.74<sup>1</sup>. Moreover, a monthly allowance which ranged from €103 to €206 according to the family's income was given to married couples for each child of second order or higher, up until age three. For children born from 1.1.2001 on, the bonus for third order births and higher was raised to €4,648.11, while the bonus for first births was restricted to children who had at least one parent with Italian citizenship. Although not comparable with measures introduced in other European countries, to the best of our knowledge this is the strongest birth-related monetary policy implemented in Italy since 1945.

**In a third phase (1.1.2004-31.12.2006)**, access to regional maternity allowances was extended to all women residing in the region, independent of marital status and citizenship. The RL n.12 of 30.4.2003 stated that its aim was to *support and provide incentives to maternity*. This extension saw a consequential decrease in money provided. The new bonuses maintained the sums of €1,550 for the first child and €3,100 for second order and higher births<sup>2</sup>. The requisites of the mother were as follows: 1) resident in the region for at least one year before the birth of the child, 2) Italian citizen or legal immigrant with at least five years of residence in Italy, 3) low family income<sup>3</sup>. This new law was applied to births in the region from 1.1.2004 on<sup>4</sup>. The monthly allowance for children of

<sup>1</sup> In the case of multiple births, a maternity bonus of 5,164.57 € was given for each child. This applied only to first order births from 1/1/2001 on.

<sup>2</sup> In the case of multiple births, a maternity bonus of 4,650 € was given for each child.

<sup>3</sup> ISEE (Family income corrected with an equivalence scale) had to be lower than 11,000 € for the firstchild and 13,000 € for second and higher order births.

<sup>4</sup> In 2004 maternity bonuses were retroactively given to unmarried mothers of children born in 2000-2003, but this extension *a posteriori* does not influence our analysis.

second order or higher was, however, suppressed. The low income threshold required in order to receive the birth bonus suggests that these new measures should be considered as a contribution to alleviating poverty rather than as an incentive for having a baby.

**Finally, in a fourth phase (from 1.1.2007 onwards)** all bonuses were suppressed, and a new system of monetary allowances for low income families<sup>5</sup> with children under the age of 18 was established. Existing bonuses were restricted to mothers of children born up until 31.12.2006. This new system was decreed in the RL n.6 of 31.3.2006, the aim of which was to support *the educative and formative function of family*. The new allowances did not, however, become effective until November 2007.

In sum, over the last decade of the 1900s, FVG family monetary policies specifically aimed at births were practically absent. Beginning on 1.1.2000, however, the regional government began to introduce substantive bonuses at birth. These bonuses were differentiated by: marital status (only married women), citizenship (only Italian or EU women), and birth order (the bonus increased for second and especially third order births). Moreover, the income threshold for receiving the bonus was not especially low. Since 1.1.2004 the new **regional** government has extended the bonuses to unmarried women and foreigners who have lived in FVG for at least five years. The amount given and the income threshold have been substantially reduced.

If the measures implemented by the RL n.2 of 22.2.2000 had an impact on fertility, then the **reproductive behaviour of Italian married women during the years 2001-04 in FVG should have changed, and we should find differences by parity and income**. Our main expectation is that we will find different behaviour among women without children (the bonus for the first child is low), those with one, and those with 2+ children (the bonus for second and higher order children is high). We also expect to find a stronger effect for less rich people (using women's education as a proxy for family income).

The behaviour of women living in FVG should also diverge from those of women living in all other Italian regions, where no significant monetary family policies were implemented.

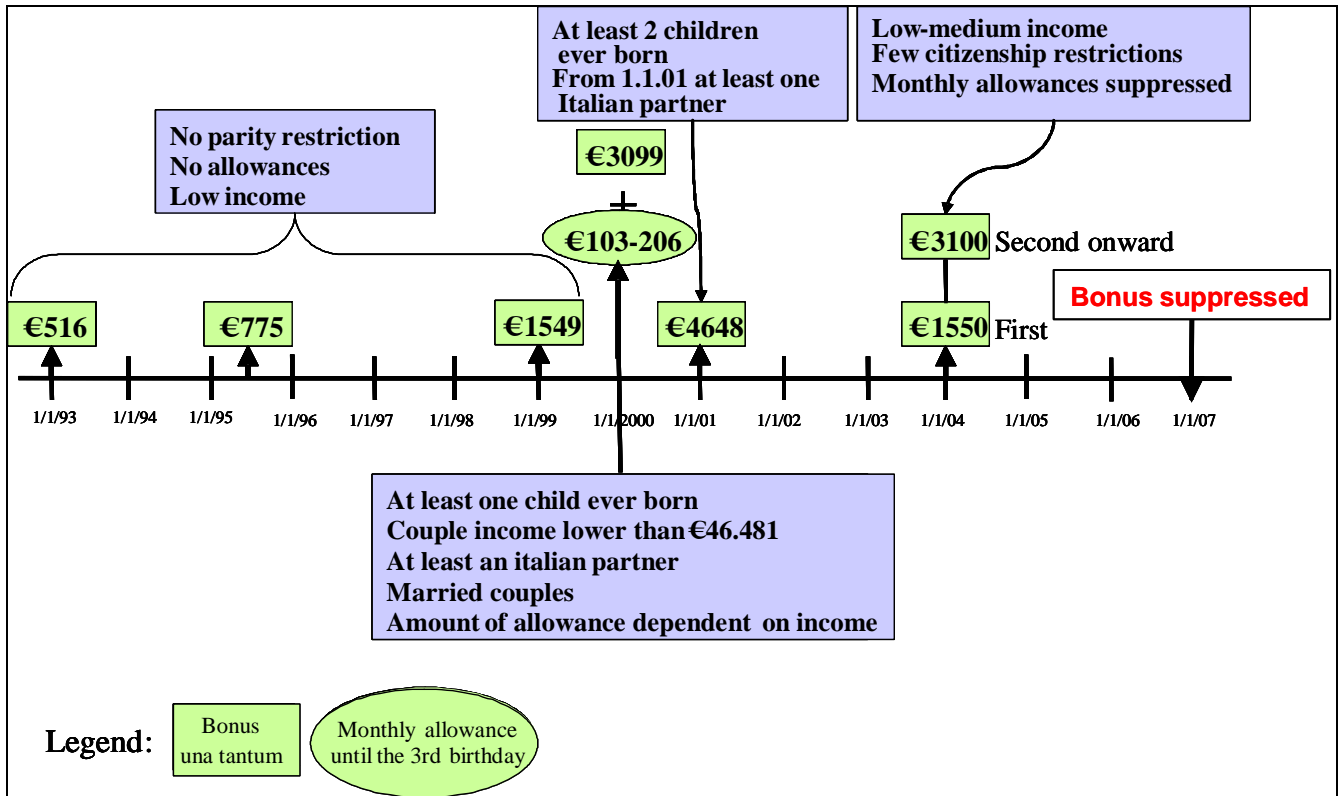
### 3 Data and sources

The content of FVG regional laws was downloaded from the Parliament (Camera dei Deputati) database of regional laws at <http://camera.mac.ancitel.it/lrec>. Other regional FVG legislation was downloaded at <http://www.regione.fvg.it> in the section: "*Delibere della giunta regionale*" (regional committee resolutions).

Births classified by (a) mother's education, (b) parity, (c) marital status, and (d) citizenship were kindly made available by the Public Regional Health Administration of FVG (years 1989-2005). The source of data for births is the certificate of delivery care (CEDAP), adopted at national level in 2002, but available for previous years in the region considered in this paper. The CEDAPs contain demographic and social variables about both parents, information concerning the pregnancy and the delivery, as well as the health of the newborn. Legal abortions for the years 1989-2005, classified by mother's education, parity, marital status, and citizenship were kindly made available by the National Institute of Statistics (ISTAT). The data source with regard to abortions is the anonymous form for induced abortion, filled out at the hospital for each intervention and sent to ISTAT. The form includes information on the demographic and social background of the woman (age, education, marital and professional status, parity, citizenship) as well as some characteristics of the abortion.

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<sup>5</sup> Those with a corrected family income of less than 5,000 € using an equivalence scale. The annual allowance is equal to the difference between this corrected family income and 5,000 €.



**Figure 1:** Monetary family policies adopted in FVG (1993-2007)

Missing values concerning mothers' characteristics were redistributed according to known data distribution. Data were also checked for inconsistencies. In particular, birth series from FVG were compared to the corresponding series of population registers, which showed only negligible differences.

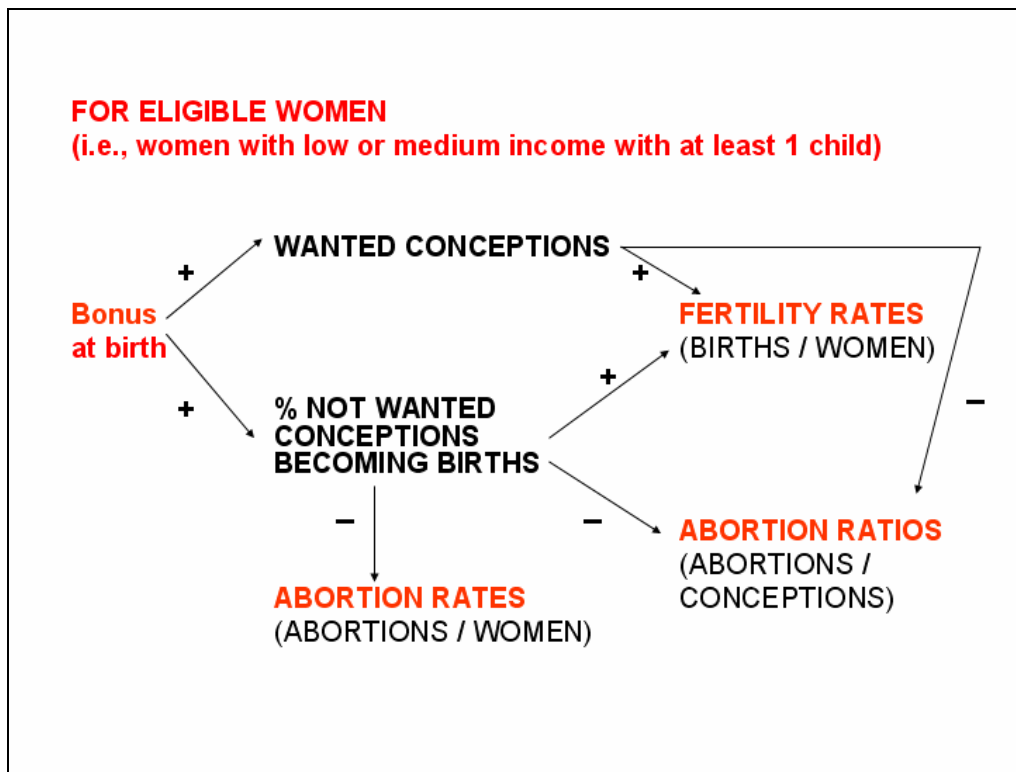
As only a few other regions have such long-term series data, it is unfortunately not possible to use the CEDAP data to compare trends in births between FVG and larger Italy. We thus estimate overall trends in births by women's parity and education in Italy through use of data from the most recent Istat survey on women's reproductive behaviour. The survey, entitled "*Famiglia e Soggetti Sociali*" (Multipurpose Survey of Families) was carried out in 2003 and consists of interviews with a representative sample of 49,541 individuals belonging to 19,227 families. For our analysis we selected all of the women in the sample who were married at the birth of their child(ren) and were not residents in FVG. We then aggregated all births<sup>6</sup> from these women according to birth order and mother's education (high/low) at the birth of each children for the years 1989-2003. Finally, using these time-series (1989 = 100) we estimated the index numbers of births and compared them to those from the FVG CEDAP series.

Finally, those regions which used CEDAPs for the years under consideration (Lazio, Tuscany, and the autonomous province of Trento) provided aggregated data relative to births and induced abortions. We used this data for a comparison with FVG.

<sup>6</sup> We weighted each birth with the respective sample weight of the mother.

## 4 Methods

We measure whether fertility behaviour changed in FVG during 2001-04 for those women most touched by the new legislation, i.e. Italian married women with at least one or more children. We assume that the impact of monetary measures was higher for less educated women given that (1) in Italy the relationship between income and education is very strong (the lower the education, the lower the income: OECD, 2004), (2) the *bonus* was practically the same in spite of income, and (3) the relative impact of the same amount of money should be stronger in a poorer family. The hypothetical relationships between bonuses at birth and demographic events are presented in fig. 2.



**Figure 2:** Hypothetical impact of the *bonus at birth* on women's reproductive behaviour

In order to test, using reliable techniques, the causal relationship between the *bonus* at birth and individual reproductive decisions, it would be necessary to carefully compare the behaviour of those who received the *bonus* with that of those who, although very similar, were not eligible for the *bonus* (Heckman et al., 1999). Unfortunately, the data needed to carry out this comparison are not available because – as often happens in Italy – when the Region put this policy in practice, no effort was made to provide the statistical instruments necessary for assessment of the effects such policies had on reproductive behaviour and the well-being of the families involved.

Consequently, our only choice is attempt to simulate an experimental situation, using the available data. The idea is to identify different groups, distinguishing between them in terms of eligibility for the *bonus* and the hypothetical impact that the former should have had on reproductive behaviour observed during the period in which the *bonus* was in force and in the preceding and following periods. If the groups most eligible for the *bonus* systematically modified their reproductive behaviour in the direction hypothesized (increase in fertility and decrease in abortion), and if among the other groups no change is simultaneously observed, then it is possible that the *bonus* had an impact.

As mentioned above, our data allow us to identify as the most eligible and hypothetically most sensitive group to the *bonus*, *married women resident in FVG with low levels of education and 2+ children*. The behaviour of these women is compared with that of three other groups of FVG

women who could have received the *bonus*, but who would have received less money (women with one child), or who would have been less eligible due to higher incomes – due to which the *bonus* would comparatively have had less of an impact (women with higher levels of education). In addition, this comparison is extended to include FVG women without children, for whom (in the period considered) no *bonus* was foreseen for the birth of the first child. Finally, six groups of FVG women are compared to analogous groups resident in other Italian regions. If the reproductive behaviour observed in FVG during the period in which the *bonus* was in act was not repeated elsewhere – no other region had a monetary policy which supported the national one – then the idea that a *bonus* had an impact on reproductive behaviour would be further strengthened.

The logic used is therefore of a difference-in-difference kind: we observe how differences in fertility and abortion in the periods in which the *bonus* was and was not effective change among different groups, identified on the basis of their eligibility and hypothetical sensitivity to the *bonus*.

|  |                | Parity |    |          |                   |
|--|----------------|--------|----|----------|-------------------|
|  |                | 0      | 1  | 2 and up |                   |
| <b>Married Italian women living in FVG</b>     | Low education  | =      | ++ | +++      | +++ Strong effect |
|  | High education | =      | +  | ++       | ++ Medium effect  |
| <b>Married Italian women NOT living in FVG</b> | Low education  | =      | =  | =        | + Weak effect     |
|  | High education | =      | =  | =        | = No effect       |

**Table 1:** Hypothesis of the effect of the bonus on reproductive behaviour

#### 4.1 Graphical analysis

To begin with, following Billari et al. (2005) we compare trends in births and abortion ratios [ $Abortions / (Abortions + Births)$ ] for women eligible or not eligible for the monetary measures, examining the differences between the number of events (or ratios) observed in years 2001-2004 and the number of events (or ratios) that would be expected if the trend between 1989 and 2000 continued unchanged (see fig. 3 for an example). We evaluate the trend in births for married Italian women in FVG against the trend for the same women in Italy as a whole (excluding FVG) where the *bonus at birth* was not implemented. This is in line with a *regression discontinuity design*, in that it identifies the impact of the policy measure with the shift in the regression line before and after the policy is introduced.<sup>7</sup>

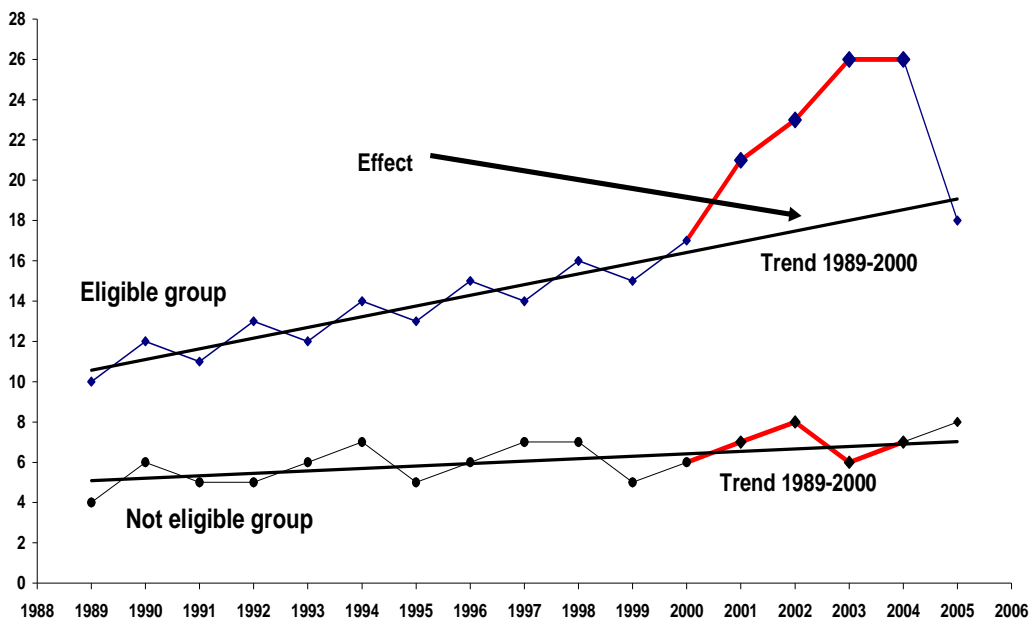
#### 4.2 Multivariate analysis

We also analyze trends in births and induced abortions using a multivariate approach. This allows us to simultaneously consider all of the aspects which the law foresees as influencing births and abortions: marital status, parity, citizenship and education (as proxy of income). With respect to births, we apply a log-linear model, where the outcome is the *number of births*; with regard to abortions, we apply a logistic model, where the outcome is the *abortion ratio*. We evaluate two interactions: that among time, marital status, parity, and citizenship and that among time, marital status, parity, and education. The *bonus* may have had an effect if, for example, there are significant increasing interaction parameters in the shift from the period up until 2000 and the following period of 2001-2003 for married low educated women of high parity. The same interaction parameters would consequently decrease for married women with no children. We use the same techniques in

<sup>7</sup> Other two groups did not have a right to the bonus: foreigners and non-married couples. However, the dynamics of births outside of wedlock and those of both parents foreign is so variable in the period under consideration that it is practically impossible to use graphic methods to map the gaps during 2001-2004 compared to the trend in the preceding period. These groups will instead be considered within the multivariate analysis presented in the following section.



order to compare FVG with other areas where the *bonus* at birth was not implemented during the same period and where similar data are available: Tuscany, Lazio, and the province of Trento. For a more extensive description of these procedures, see the Appendix.



**Figure 3:** Hypothetical effect of a monetary *bonus* on births

## 5 Results

### 5.1 Graphical analysis

First, we compare actual births of married Italian women in FVG in 2001-2004 with births expected from the same women if the trend for 1989-2000 remained unchanged over the following years. We examine births of women by parity and education. The main results are:

- 1) There is a remarkable divergence between birth trends and actual births in 2001-2004 for women with 2+ children (fig. 4), mostly due to women with low levels of education (supposedly more receptive to a *bonus* and allowances).
- 2) Conversely, there is no effect for low educated women with parity 0 and 1 (fig. 5). Thus, the FVG fertility policy may have affected only poor women with access the largest *bonus*.
- 3) For women with the highest levels of education, the changes are less intense but also concern women who already have a child (fig. 6).

We also compare actual abortion ratios of married Italian women in FVG with those expected if the 1989-2000 trend had remained unchanged (fig. 7 and fig. 8).

- 1) Abortion ratios for low educated women decreased in 2001-2004 mostly among those with 2+ children, but also for women who already had one child.
- 2) For high educated women, changes concern only those women with parity 2+.

In table 2 we show the differences between the actual number of births recorded in 2001-04 and the birth trend projection from 1989-2000. The number of births increases for women with parity 1 and 2+, whereas it decreases for women without children. In table 3, we compare observed abortion ratios with those expected according to the projections from the 1989-2000 trend. Abortion ratios

decrease for women with parity 2+, especially for low educated women but also for high educated women. The differences diminish for parity 1 and disappear for parity 0.

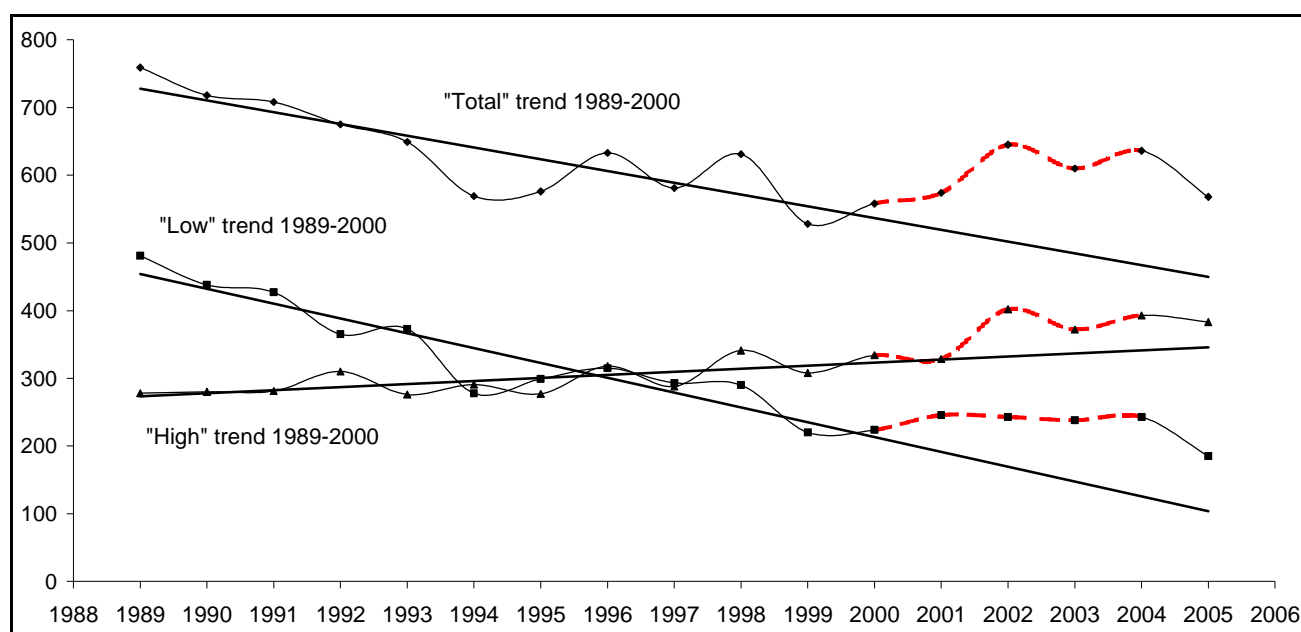
| Education |      |      |       |
|-----------|------|------|-------|
| Parity    | Low  | High | Total |
| 0         | -650 | -422 | 1.072 |
| 1         | +103 | +434 | 537   |
| 2+        | +332 | +157 | 489   |
| Total     | -215 | +169 | -46   |

**Table 2:** Number of children by parity (0, 1, 2+) and education (low, high) during 2001-04. Difference between actual numbers and projections from 1989-2000 trend. Married Italian women living in FVG

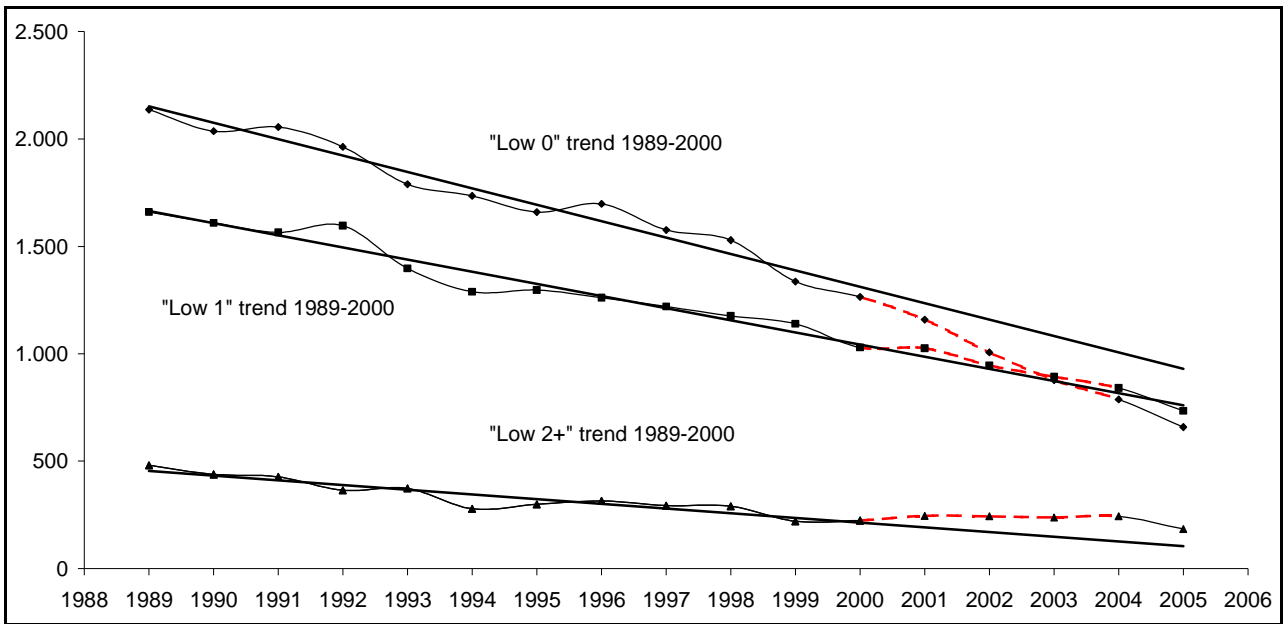
|      | Low education |    |    | High education |    |    |
|------|---------------|----|----|----------------|----|----|
|      | Parity        |    |    | Parity         |    |    |
|      | 0             | 1  | 2+ | 0              | 1  | 2+ |
| 2001 | 0             | -2 | -3 | 0              | 0  | -1 |
| 2002 | 0             | -1 | -2 | 1              | 0  | -4 |
| 2003 | 0             | -2 | -8 | 1              | -1 | -3 |
| 2004 | 2             | 1  | -8 | 1              | 0  | -1 |

**Table 3.** Abortion ratios by parity (0, 1, 2+) and education (low, high) during 2001-04. Difference between actual rates and projections from 1989-2000 trend. Married Italian women living in FVG

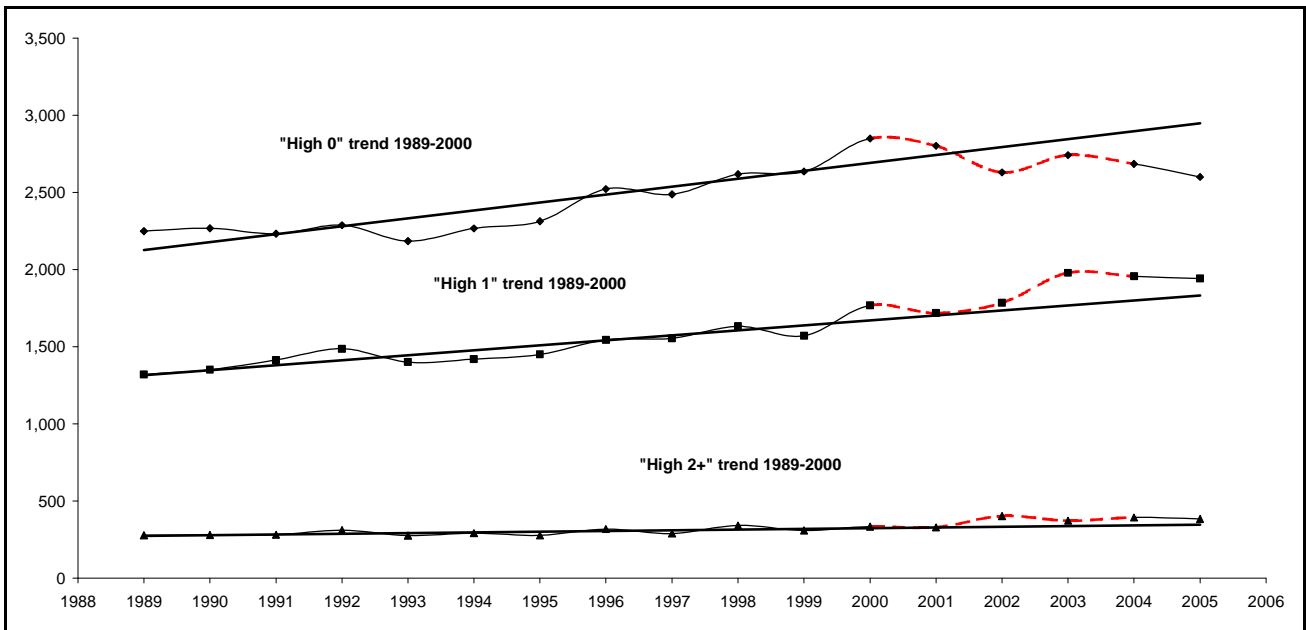
We also compare births of women with 2+ children in FVG with those in Italy (fig. 9 and fig. 10). The index numbers for low educated women diverge noticeably after 2000: in FVG there is a positive divergence from the previous 1989-2000 trend, whereas in Italy the decrease intensifies. Differences for high educated women with 2+ children are less marked, although a slight increase in FVG can be observed while in Italy the trend does not change.



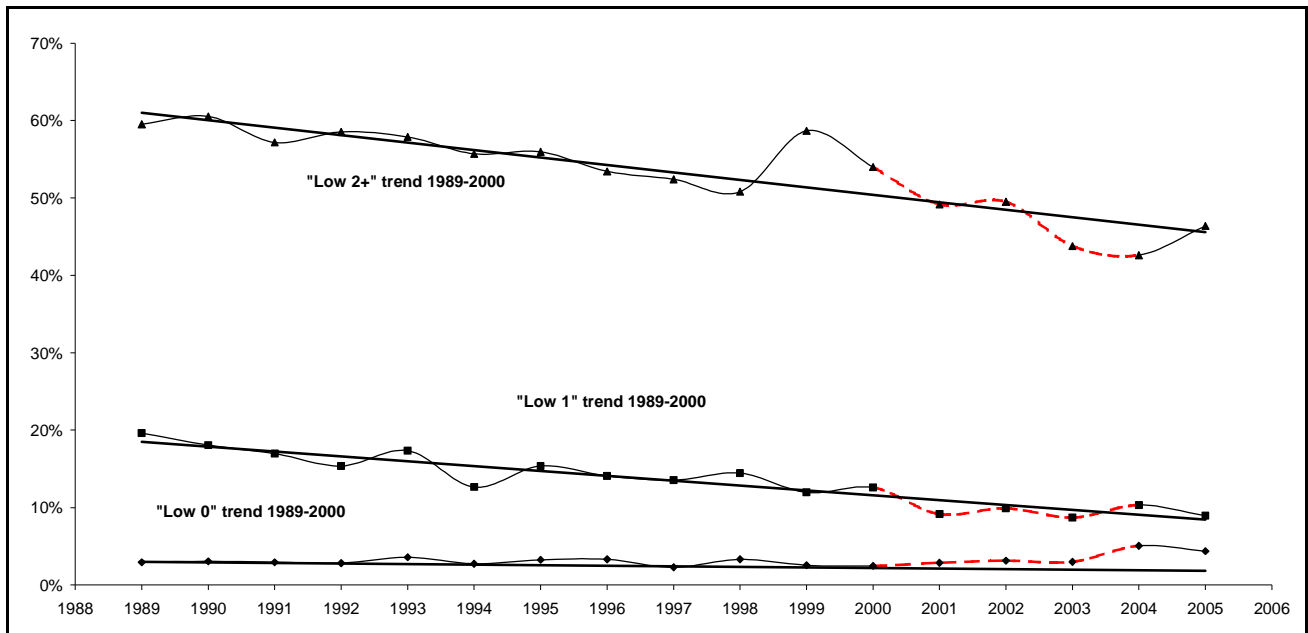
**Figure 4:** Number of children by mother's education 1989-2005. Women with parity 2+. Actual number and projection from 1989-2000 trend. Married Italian women living in FVG



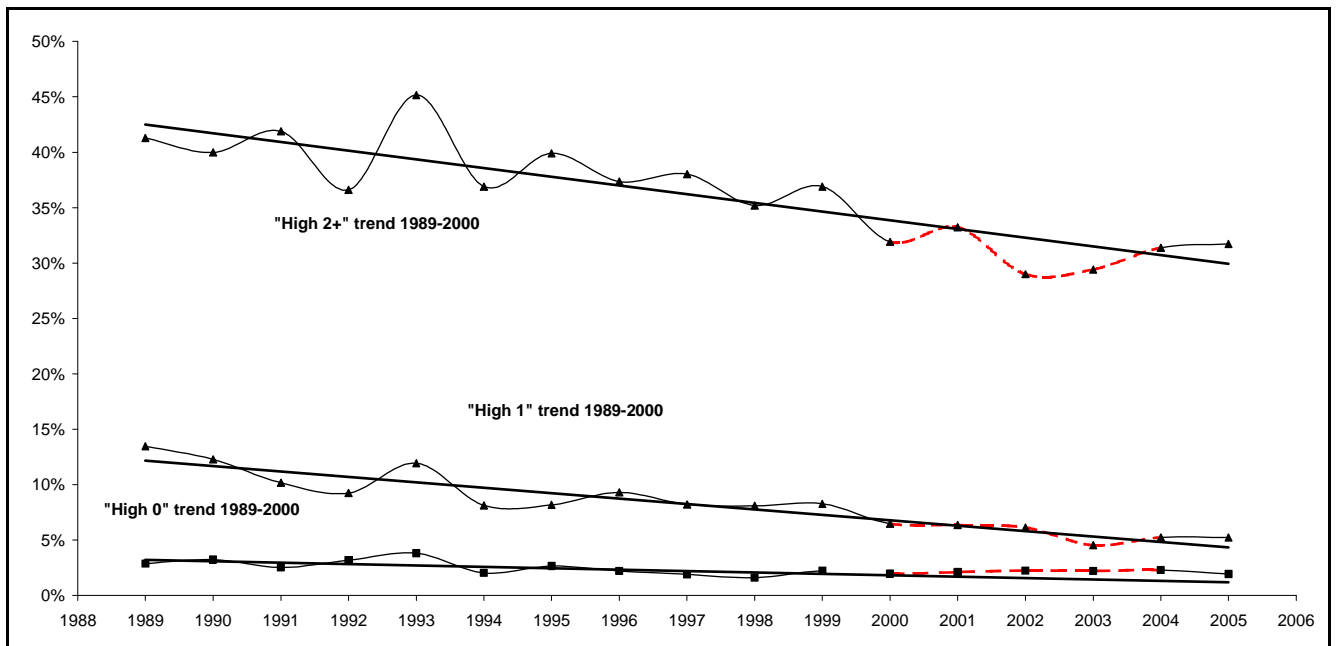
**Figure 5:** Number of children by mother's parity 1989-2005. Low educated women. Actual number and projection from 1989-2000 trend. Married Italian women living in FVG



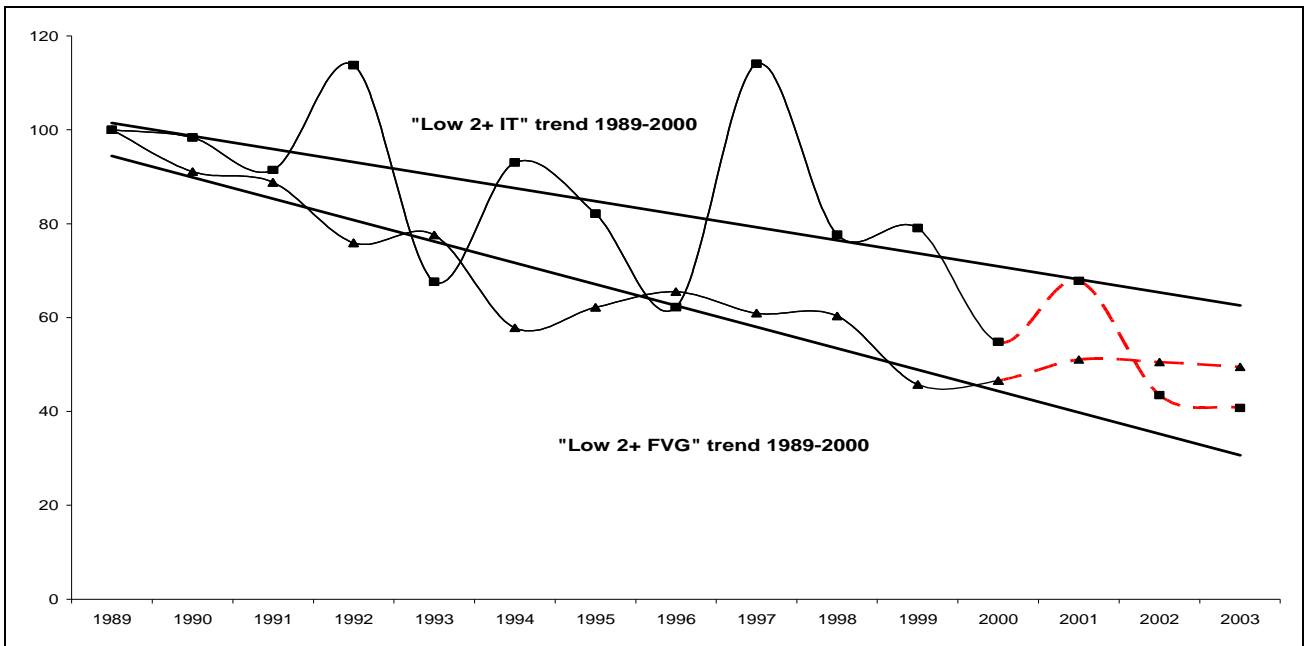
**Figure 6:** Number of children by mother's parity 1989-2005. High educated women. Actual number and projection from 1989-2000 trend. Married Italian women living in FVG



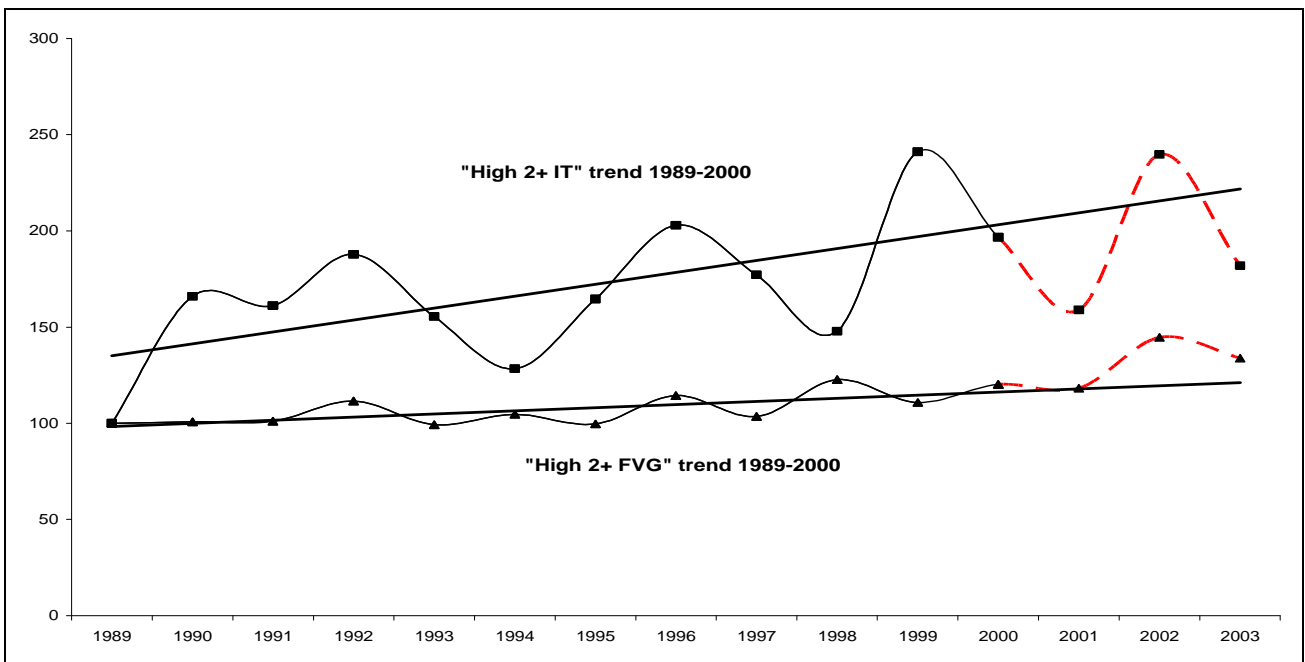
**Figure 7:** Abortion ratio by mother's parity 1989-2005. Low educated women. Actual ratios and projection from 1989-2000 trend. Married Italian women living in FVG



**Figure 8:** Abortion ratio by mother's parity 1989-2005. High educated women. Actual ratios and projection from 1989-2000 trend. Married Italian women living in FVG



**Figure 9:** Index numbers of births (1989=100). Low educated women. Actual births and projection from 1989-2000 trend. Married Italian women living/not living in FVG.



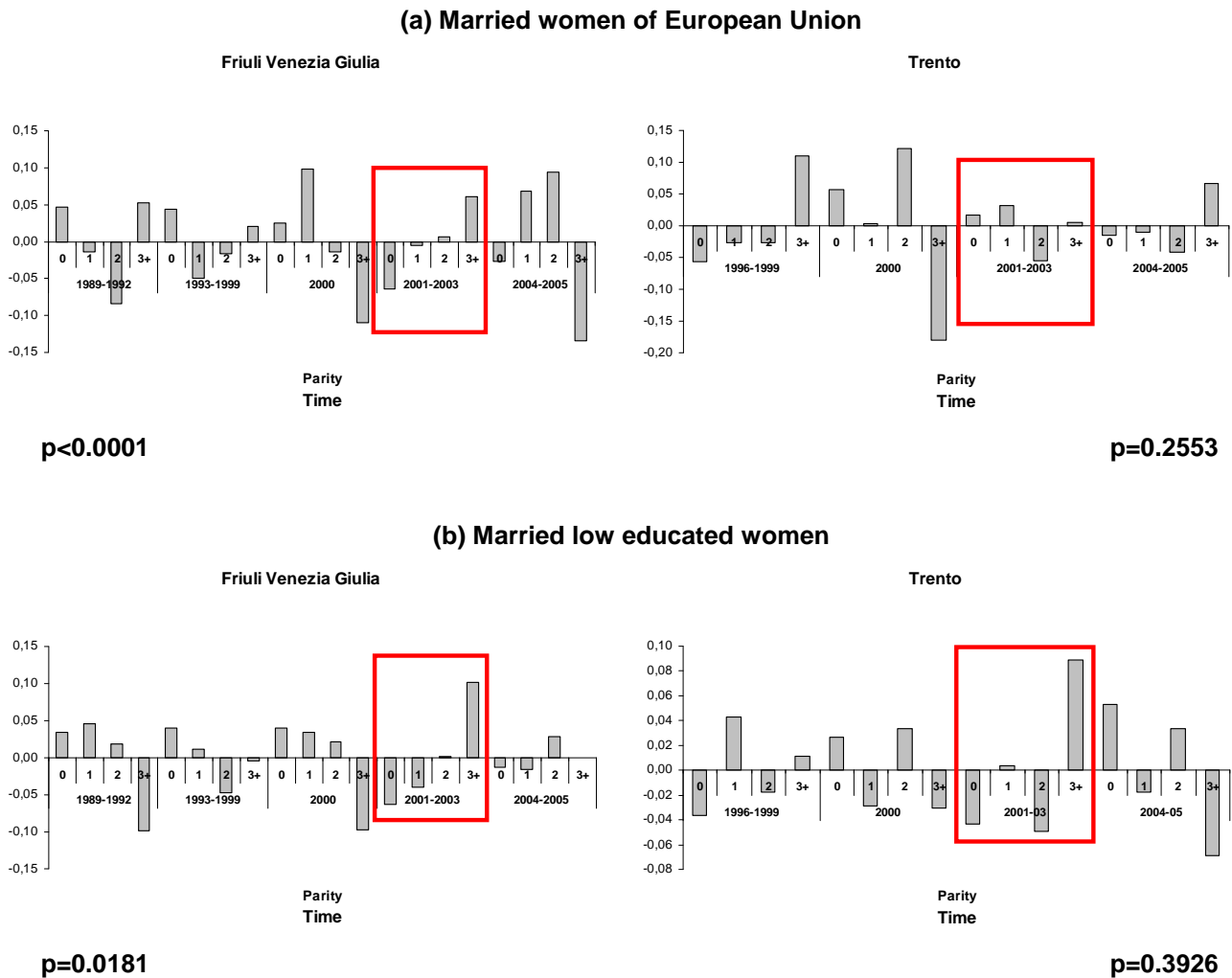
**Figure 10:** Index numbers of births (1989=100). High educated women. Actual births and projection from 1989-2000 trend. Married Italian women living/not living in FVG.

## 5.2 Multivariate analysis

With regard to births, the log-linear model selected as the most parsimonious for FVG contains several high-order interactions. Some of them describe the population structure and relevant trends in fertility. For example, first-order parameters of parity decrease from 0 to 3+, whereas interactions between time and citizenship decline for EU citizens and increase for non-EU individuals. This is

due in large part to the greater and greater number of women born outside the European Union residing in FVG.

The focus of our analysis is on the interactions among time, marital status, parity and educational level (or citizenship). The first three variables are necessarily included, as the 2001 policy only applied to married women with one, two, or more children. Figure 11 and table 4 show that in FVG during 2001-03 the direction of the interactions with parity drastically changed, favouring women with 2+ children. On the other hand, applying the same model to Trento shows that these interactions are not significant and do not follow an upward trend.



**Figure 11:** Log-linear model on births: interaction among time, parity, marital status, and citizenship (or education). Model fitted for FVG Region and applied to the Province of Trento.

The log-linear model selected as most parsimonious for the Province of Trento does not include the higher-order interactions (only lower-order interactions are present). We looked at the following interactions: time-marital status-parity, time-educational level-citizenship, time-citizenship-marital status. Such interactions go in opposite directions with respect to FVG: we detect a decrease of parameters among married women with children, married low educated women, low educated women born in the European Union, and married EU-women. In the model selected for Tuscany, only the interaction with education is significant. On the other hand, an increasing trend in parity in the 2001-03 parameters is not evident; rather, the greatest negative parameter concerns 3+ children. With regard to the region of Lazio, accurate comparisons are not possible as data stratified by

marital status are not available. In any case, the interactions time-education-parity and time-citizenship-parity are not statistically significant for the periods under examination, and during 2001-03 the interaction time-education-citizenship shows a decrease in births among low educated women born in the European Union.

With regard to the logistic model of induced abortion, results for FVG do not conflict with our expectations, although a clear change in the sign of parameters is not present when moving from low to high parities, as observed in the log-linear model for births.

#### Friuli Venezia Giulia

| Interaction time-citizenship-marital status-parity ( $p < 0.0001$ ) |             |        |                |               |               |
|---|-------------|--------|----------------|---------------|---------------|
| Time  | Citizenship | Parity | Estimate       | s.e.          | p             |
| 1989-92   | EU          | 0      | 0.0465         | 0.0310        | ns            |
| 1989-92   | EU          | 1      | -0.0141        | 0.0332        | ns            |
| <b>1989-92</b>  | EU          | 2      | <b>-0.0841</b> | <b>0.0425</b> | <b>0.0480</b> |
| 1989-92   | EU          | 3+     | <i>0.0517</i>  |               |               |
| <b>1993-99</b>  | EU          | 0      | <b>0.0439</b>  | <b>0.0201</b> | <b>0.0288</b> |
| <b>1993-99</b>  | EU          | 1      | <b>-0.0489</b> | <b>0.0215</b> | <b>0.0232</b> |
| 1993-99   | EU          | 2      | -0.0161        | 0.0289        | ns            |
| 1993-99   | EU          | 3+     | <i>0.0211</i>  |               |               |
| 2000  | EU          | 0      | 0.0255         | 0.0342        | ns            |
| <b>2000</b>   | EU          | 1      | <b>0.0979</b>  | <b>0.0376</b> | <b>0.0093</b> |
| 2000  | EU          | 2      | -0.014         | 0.0502        | ns            |
| 2000  | EU          | 3+     | <i>-0.1094</i> |               |               |
| <b>2001-03</b>  | EU          | 0      | <b>-0.0635</b> | <b>0.0210</b> | <b>0.0025</b> |
| 2001-03   | EU          | 1      | -0.0047        | 0.0226        | ns            |
| 2001-03   | EU          | 2      | 0.0067         | 0.0298        | ns            |
| 2001-03   | EU          | 3+     | <i>0.0615</i>  |               |               |
| 2004-05   | EU          | 0      | -0.0269        |               |               |
| 2004-05   | EU          | 1      | <i>0.0677</i>  |               |               |
| 2004-05   | EU          | 2      | <i>0.0935</i>  |               |               |
| 2004-05   | EU          | 3+     | <i>-0.1343</i> |               |               |

| Interaction time-educational level-marital status-parity ( $p < 0.0181$ ) |                   |        |                |               |              |
|---|-------------------|--------|----------------|---------------|--------------|
| Time  | Educational level | Parity | Estimate       | s.e.          | p            |
| 1989-92   | low               | 0      | 0.0348         | 0.0309        | ns           |
| 1989-92   | low               | 1      | 0.0452         | 0.0332        | ns           |
| 1989-92   | low               | 2      | 0.0184         | 0.0425        | ns           |
| 1989-92   | low               | 3+     | <i>-0.0984</i> |               |              |
| <b>1993-99</b>  | low               | 0      | <b>0.0398</b>  | <b>0.0204</b> | <b>0.05</b>  |
| 1993-99   | low               | 1      | 0.0113         | 0.0217        | ns           |
| 1993-99   | low               | 2      | -0.0474        | 0.029         | ns           |
| 1993-99   | low               | 3+     | <i>-0.0037</i> |               |              |
| 2000  | low               | 0      | 0.0407         | 0.0351        | ns           |
| 2000  | low               | 1      | 0.0345         | 0.0383        | ns           |
| 2000  | low               | 2      | 0.0218         | 0.0503        | ns           |
| 2000  | low               | 3+     | <i>-0.097</i>  |               |              |
| <b>2001-03</b>  | low               | 0      | <b>-0.0622</b> | <b>0.0211</b> | <b>0.003</b> |
| <b>2001-03</b>  | <b>low</b>        | 1      | <b>-0.0403</b> | <b>0.0227</b> | <b>0.075</b> |
| 2001-03   | low               | 2      | 0.0011         | 0.0298        | ns           |
| 2001-03   | low               | 3+     | <i>0.1014</i>  |               |              |
| 2004-05   | low               | 0      | <i>-0.0124</i> |               |              |
| 2004-05   | low               | 1      | <i>-0.0162</i> |               |              |
| 2004-05   | low               | 2      | <i>0.0279</i>  |               |              |
| 2004-05   | low               | 3+     | <i>0.0007</i>  |               |              |

#### Province of Trento

| Interaction time-citizenship-marital status-parity ( $p = 0.2553$ ) |              |        |                |               |               |
|---|--------------|--------|----------------|---------------|---------------|
| Periodo   | Citizen-ship | Parity | Estimate       | s.e.          | p             |
| <b>1996-1999</b>  | EU           | 0      | <b>-0.0572</b> | <b>0.0201</b> | <b>0.0288</b> |
| <b>1996-1999</b>  | EU           | 1      | <b>-0.0261</b> | <b>0.0215</b> | <b>0.0232</b> |
| 1996-1999   | EU           | 2      | -0.0259        | 0.0289        | ns            |
| 1996-1999   | EU           | 3+     | <i>0.1092</i>  |               |               |
| 2000  | EU           | 0      | 0.0559         | 0.0342        | ns            |
| <b>2000</b>   | EU           | 1      | <b>0.0036</b>  | <b>0.0376</b> | <b>0.0093</b> |
| 2000  | EU           | 2      | 0.1213         | 0.0502        | ns            |
| 2000  | EU           | 3+     | <i>-0.1808</i> |               |               |
| <b>2001-2003</b>  | EU           | 0      | <b>0.0171</b>  | <b>0.0210</b> | <b>0.0025</b> |
| 2001-2003   | EU           | 1      | 0.0324         | 0.0226        | ns            |
| 2001-2003   | EU           | 2      | -0.0545        | 0.0298        | ns            |
| 2001-2003   | EU           | 3+     | <i>0.0050</i>  |               |               |
| 2004-2005   | EU           | 0      | <i>-0.0158</i> |               |               |
| 2004-2005   | EU           | 1      | <i>-0.0099</i> |               |               |
| 2004-2005   | EU           | 2      | <i>-0.0409</i> |               |               |
| 2004-2005   | EU           | 3+     | <i>0.0666</i>  |               |               |

| Interaction time-educational level-marital status-parity ( $p = 0.3926$ ) |                   |        |                |               |              |
|---|-------------------|--------|----------------|---------------|--------------|
| Time  | Educational level | Parity | Estimate       | s.e.          | p            |
| <b>1996-1999</b>  | low               | 0      | -0.0365        | 0.0309        | ns           |
| <b>1996-1999</b>  | low               | 1      | 0.0427         | 0.0332        | ns           |
| 1996-1999   | low               | 2      | -0.0175        | 0.0425        | ns           |
| 1996-1999   | low               | 3+     | <i>0.0113</i>  |               |              |
| <b>2000</b>   | low               | 0      | <b>0.0267</b>  | <b>0.0204</b> | <b>0.05</b>  |
| 2000  | low               | 1      | -0.0289        | 0.0217        | ns           |
| 2000  | low               | 2      | 0.0331         | 0.029         | ns           |
| 2000  | low               | 3+     | <i>-0.0309</i> |               |              |
| <b>2001-03</b>  | low               | 0      | <b>-0.0431</b> | <b>0.0211</b> | <b>0.003</b> |
| <b>2001-03</b>  | <b>low</b>        | 1      | <b>0.0038</b>  | <b>0.0227</b> | <b>0.075</b> |
| 2001-03   | low               | 2      | -0.0493        | 0.0298        | ns           |
| 2001-03   | low               | 3+     | <i>0.0886</i>  |               |              |
| 2004-05   | low               | 0      | <i>0.0529</i>  |               |              |
| 2004-05   | low               | 1      | <i>-0.0176</i> |               |              |
| 2004-05   | low               | 2      | <i>0.0337</i>  |               |              |
| 2004-05   | low               | 3+     | <i>-0.069</i>  |               |              |

Note: parameters in italics are obtained by the constraint of zero sum  
n.s. = not significant

**Table 4.** Log-linear model concerning births of married women: interactions among time, parity, marital status, and citizenship/educational level. Friuli Venezia Giulia and Province of Trento.

## 6 Conclusion

Can monetary policies enhance fertility? In this paper we study the case of the Italian region of FVG, where a fertility policy offering considerable monetary *bonuses at birth* was implemented in the years 2000-2003. We analyze the differences between observed number of births and abortion ratios in years 2001-2004 with estimated births and abortions ratios had the previous 1989-2000 trend remained unchanged. We find noteworthy differences between non-eligible and eligible women for the *bonuses at birth*, especially for those with 2+ children and low education. This result is strengthened by the fact that in other areas – where no monetary measures were implemented in addition to that already adopted at the national level – we observe no significant variation in birth trends for the same period and the same groups of women.

We can thus affirm – albeit within the limits of this non-experimental study – that the *bonus* increased higher order births in FVG, particularly for women with low levels of education who already had at least two children. As the number of these women is relatively low, the effect on fertility was modest: 1,000 more births than in the four-year period 2001-2004, or +2-3% with respect to the total.

This result should not, however, be underestimated, especially when evaluated in light of similar results for Italy obtained by Billari et al (2005) concerning monetary aid (introduced by the Turco law of 1999) provided to families with three or more children. In fact, as mentioned above, over the last thirty years, both Italy and FVG have been characterized by a large gap between desired and actual fertility. This discrepancy is particularly marked for poorer couples. In a recent survey (2002) on a sample of mothers all around the age of 42 living in five Italian cities (including Udine, one of the principle cities of FVG), women were asked to explain why they had stopped having children at a certain parity. With regard to the transition to a third child (or women who had stopped at two children) economic reasons were cited as important among those who had experienced a worsening in their financial situation after the birth of their first or second child. Women suggested that monetary transfers over the first three years after the birth of a third child, or a lower but longer financial incentive might have changed their decision to stop at parity two (De Santis and Breschi, 2003). Although ex-post motivations are possibly biased, the role of economic factors is specific to third births.

Our results are in line with the above studies. Monetary incentives and a reduction in the direct costs of childrearing may be effective in stimulating fertility for low income Italian women, freeing them of constraints due to lesser economic resources.

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## Appendix: models employed in the multivariate analysis

**Variables and conditions.** The variables with which we estimate the impact of the *bonus* on births and abortions are those most sensitive to different legislation implemented in FVG over the period 1989-2005: year, marital status, parity, citizenship, and level of education (here considered as a proxy of income). These variables are all considered as nominal, according to the following conditions:

- TIME: five periods corresponding to legislative modifications: 1989-1992, 1993-1999, 2000, 2001-2003, 2004-2005.
- MARITAL STATUS: married, not married
- LEVEL OF EDUCATION: low (up to middle school), high (high school or university)
- CITIZENSHIP: EU community, outside EU
- PARITY: 0, 1, 2, 3+

Unlike in the graphical analysis, in this part we preferred to keep the time references correspondent to the legislation (see fig. 1), even if the hypothetical effects on fertility (but not on abortion) should be off by about a year. In any case, even with the time intervals off a year, the results are about the same.

**Log-linear models and logistic models.** Analysis of the effect of these variables on fertility and abortion was carried out using log-linear models for births (dependent variable: number of births) and logistic models for abortions (dependent variable: abortion ratio Abortion/Births). The choice of using a log-linear model in the case of births was dictated by the absence of denominators according to the variables of interest, or rather that of the female population of reproductive age stratified by marital status, parity, citizenship and level of education. As a consequence, the results from the log-linear models depend *in primis* on the population structure and on intrinsic fertility dynamics; the results from the logistic models are not affected by the population structure but depend on abortion dynamics. In the log-linear models, structural aspects of the population were obtained from the principle effects and by several high order interactions (for example between marital status and fertility), while the other interactions evaluate dynamics relative to fertility. In light of our goals, only some higher order interactions are of interest. More specifically, we are interested only in those which include time, as our objective is to evaluate if there occurred changes in behaviour after norms incentivizing fertility were introduced. Unlike the log-linear models, in the logistic models the principle effects already represent the impact of the explanatory variable on the abortion ratio.

**Choice of the “best model”.** First off, the significant interactions were selected through use of a *backward* hierarchical approach: beginning with the saturated model we excluded the non-significant interactions (CATMOD procedure using SAS<sup>®</sup>). Second, using the model thus obtained, the excluded interactions were inserted one at a time in order to evaluate if – when considered individually – their specific contribution to the representation of the data was significant. We thus developed the final model which, because it endeavours to consider only and all of the significant interactions, is no longer of a hierarchical nature.

**Comparison with the other regions.** Finally, we compared FVG with other Italian areas (the autonomous province of Trento, Tuscany, and Lazio). This was somewhat complicated by the fact that data of the same detail was not always available (i.e. marital status in Lazio is not present while in Tuscany data is available beginning only in 2000). Two approaches were employed: (1) we studied the fit of the “best” model for FVG with that of the other three regions; (2) we applied the same model selection procedure used for FVG to the other three areas, in order to see which interactions resulted significant.

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The extended results are available upon request. In this article, using the log-linear models we have graphically represented the interactions between time, parity, citizenship, and marital status and between time, parity, educational level, and marital status (see figure 11). These interactions are significant and in the sign expected for FVG but not in the other areas considered, providing confirmation of the significant impact generous bonuses had on higher order births in FVG, mainly for not rich people.