

# WORKING PAPERS IN ECONOMICS

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No. 1202

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THE IMPACT OF A CASH BENEFIT  
REFORM ON PARENTS' LABOUR  
FORCE PARTICIPATION.

Department of Economics

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# **The Impact of a Cash Benefit Reform on Parents' Labour Force Participation.**

By

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(April 30, 2002)

**Abstract:** This paper evaluates the impact of a recent Norwegian family policy reform. The reform provides benefits of up to NOK 3000 per month to all families with 1-3 year old children, who do not utilise state subsidised day care centres. We investigate the reform's effect on parents' labour force participation. Our findings suggest that, on average, women's labour force participation decreases and specialisation of work between couples increases after the reform. When we evaluate the reform's impact in association with women's schooling we find that the decrease in the labour force participation of mothers who have university level schooling is larger as compared with mothers who have less than university schooling.

**Key Words:** Public policy, Cash benefits, Specialisation

**JEL Classifications:** I38, J16, J22

I am grateful to Espen Bratberg , Alf Erling Risa , Kjell Vaage, Arild Aakvik and Afsane Bjorvatn for their helpful suggestions and comments. This paper was presented in a seminar at the Department of Economics, University of Bergen, Norway. I am thankful to the participants of the seminar for their positive feedback.

## 1. Introduction

Many empirical studies support the notion that the presence of young children typically increases the value of women's time at home (see Gronau 1973; Leibowitz and Klerman 1995; Nakamura and Nakamura 1994), leading to a decrease in her labour market activity. However, the labour force participation of mothers with pre school children is higher in Norway than in many of the other West European countries. In 1997, the labour force participation rate among married and cohabiting mothers was 75 percent if the youngest child was less than 3 years old and was 83 percent if the child was 3-6 years old (Statistics Norway 98). Empirical studies on Scandinavian data suggest that high quality public childcare encourage labour market activity of women with preschool children (see, for instance, Gustafsson and Stafford 1992; Kravdal 1996).

In the spring of 1998 the Norwegian government decided to introduce cash benefits up to NOK 3000 (approximately €375) per month to parents with children of 1-3 years old, who do not utilise state subsidised day care facilities. This amount is roughly equivalent to the state subsidy per child to day care centres. Parents that utilise some, but not all day care are entitled to receive a proportionally lower cash benefit.

Economic theory suggests that public provision of day care increases efficiency in the economy. The argument is based on the income tax wedge between home production and market work. Due to this wedge too little market work is provided. Childcare subsidies increase efficiency by stimulating the labour force participation of mothers, thereby increasing the tax base and mitigating the effects of the income tax (see Blomquist and Christiansen 1995; Bergstrom and Blomquist 1996). Whether a shift from childcare subsidies

to cash benefits produces efficiency loss is an interesting question that we address later in the paper.

The cash benefits offered to parents with children of 1-3 years old are not tested against the parents' labour market participation. It is therefore fully possible for both parents to work while receiving benefits. Nonetheless, these benefits increase the costs of childcare centres for parents. The empirical literature suggests that high childcare costs have negative effect on married women's labour force participation (see Blau and Robins 1988; Riber 1992). Thus, the cash benefits reform may reduce parents', especially mothers', labour force participation in Norway. Evaluating the effect of the reform on parents' working behaviour is the main objective of this paper. Parents' working behaviour is evaluated along two dimensions: specialisation and total market intensity<sup>1</sup>.

The literature on household economics discusses that a large part of a surplus in the marriage is generated from specialisation. If one of the spouses has a comparative advantage in the provision of home time to commodity production, while the other one has a comparative advantage in earning the income that purchases market inputs, then family utility will be maximised by specialisation in the time allocation of the couple (see Becker 1973, 1985; Weiss 1997). There is ample evidence for specialisation within the household. Married men work longer hours in the market and have substantially higher wages than unmarried men. Married women have lower wages and work more at home than unmarried women (see Gronau 1986; Daniel 1992; Korenman and Neumark 1992). Due to both social and biological factors women have a comparative advantage in the production and care of children. We therefore believe that the cash benefits reform particularly increases the value of mothers'

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<sup>1</sup>Lundberg and Rose (1999) define market intensity as sum of the working hours of a couple and specialisation as husband's working hours – wife's working hours. We use same definitions in this paper.

time at home. Whether consequently specialisation increases in households is an empirical question that is addressed in this paper. Lundberg and Rose (1999) emphasise that childcare costs also affect parents' total market intensity. They find that in the United States specialisation increases and total market intensity of parents decreases after a childbirth. This gives us incentive to evaluate the effect of the cash benefits reform also on Norwegian couples' total market intensity.

The impact of cash benefits on specialisation and market intensity may differ for groups of individuals depending on their characteristics. Becker describes human capital as an important determinant of specialisation in households. Human capital analysis assumes that schooling raises earnings and productivity in the market sector, which establishes a positive association between females' education and their labour force participation. This in turn leads to a lower level of specialisation between couples where wives have higher schooling as compared with couples where wives have lower schooling. In addition women with high education, experience, and income have significantly lower probabilities of job exits in Norway (see for instance, Nilsen, A.E. Risa and A. Torstensen 2000). All this suggests that due to the cash benefits reform women with lower level of schooling will be more motivated to reduce market work as compared with high level. In order to test this hypothesis we explore the effect of cash benefit reform in association with mothers' schooling.

A number of empirical studies in Norway compare women's labour force participation before and after the cash benefit reform of 98. Hellevik (2000) and Rønsen (2001) report that mothers have shifted from full time work to part time work after the introduction of cash benefits. Langset, Lian and Thoresen (2000) estimate that the labour supply of working women is reduced most in the health sector. A shortcoming of these studies is that they only

discuss the labour force participation of the women who receive the cash benefits without taking into consideration the problem arising by sample selection bias. In the econometric literature a wide range of non-experimental estimators have been proposed to evaluate the unbiased effects of social programs (see Heckman and Robb 1985; Moffitt 1991; Heckman, Lalonde and Smith 1999). This paper addresses the selection bias problem and defines an estimator of the reform on the basis of econometric methods.

The rest of the paper is organised as follows. Section 2 reports the source of our data and explains our sample. Section 3 specifies the econometric model we use to evaluate the reform effect. Section 4 discusses the effect of the cash benefit reform on specialisation and working hours of couples. Section 5 concludes our research.

## **2. Data and Sample**

The sources of our data are living standard surveys conducted in April/May 1998 and 1999.

The 1998 survey was carried out six months before the introduction of cash benefit reforms and includes 2436 households. The 1999 survey was conducted six months after the reform and includes all mothers in 1998 who still had a pre-school child as well as new mothers who had given birth to a child between the surveys. The sample in 1999 totalled 3334 households.

The sample used in this paper includes both participants and non-participants of the cash benefit program. We define all parents with a child of age 1 -3, whether they receive or do not receive the benefits<sup>2</sup> as participants and all parents with a child of age 3-6 as non-participants. By using the living standard surveys of 98 and 99, we form a pseudo panel of these two

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<sup>2</sup> Almost 70 % of parents with 1-3 year old child choose to receive cash benefits.

groups. A genuine panel tracks the same individuals over time, whereas a pseudo panel tracks cohorts/ groups over time. A cohort/group in a pseudo panel may very well comprise of different set of individuals in each period (see Deaton 1985 for details about pseudo panels).

The total number of observations in our sample is 4382. 2611 of them are for couples with children of age 1-3 in 98 or 99. The rest are for couples with children of age 3-6. There are almost 8 % households in the sample where wives' working hours are higher than their husbands. We run regression by excluding those couples but get almost the same results (results not shown).

The mean and standard deviation of the important variables in the sample are illustrated in Table 1.

[Table 1 about here]

### **3. Econometric Specification**

We are interested in evaluating the impact of the cash benefit reform of 98 on specialisation, total market intensity, and individual working hours of the Norwegian couples. This section specifies an estimator of the reform effect. Let  $Y$  be the outcome variable and make the following definitions:

$Y_{it}^*$  = level of outcome variable for a couple  $i$  who has a 13 years old child at time  $t$  if the cash benefits reform was not introduced.

$Y_{it}^{**}$  = level of outcome variable for a couple  $i$  who has a 1-3 years old child at time  $t$  after the cash benefits reform was introduced.

The difference between these two quantities is the effect of the reform, denoted as  $\mathbf{a}$ :

$$\mathbf{a} = Y_{it}^{**} - Y_{it}^* \quad (3.1)$$

Our aim is to obtain an estimator of  $\mathbf{a}$ , the reform effect. The difficulty arises as we can not observe the counterfactual  $Y_{it}^*$  directly, but only the values of  $Y_{it}^*$  for couples who are not eligible to get the cash benefits. In our sample these couples have a child of age 3-6. The estimate of  $\mathbf{a}$  in this case would be:

$$\tilde{\mathbf{a}} = (\bar{Y}_{it}^{**} | d = 1) - (\bar{Y}_{it}^* | d = 0) \quad (3.2)$$

where  $d = 1$  if couples have a child of age 1-3 and  $d = 0$  if couples have a child of age 3-6.

$\bar{Y}_{it}^{**} | d = 1$  and  $\bar{Y}_{it}^* | d = 0$  are the corresponding average values of  $Y_{it}$ .

However, the estimator defined in (3.2) is biased because:

$$\bar{Y}_{it}^* | d = 1 \neq \bar{Y}_{it}^* | d = 0 \quad (3.3)$$

Even if the cash benefits were not introduced the level of outcome variable for parents with a child of age 1-3 would be different as compared with parents with a child of age 3-6. The



main reason for this difference is that the level of parents' labour force participation varies with the age of children

Using the cohort data before and after the reform we can alleviate the selection bias problem. Assume that difference in past levels of outcome variable of parents with 1-3 years old child and parents with 3-6 years old child may adequately control for their difference in  $Y_{it}^*$ :

$$(\bar{Y}_{it}^* - \bar{Y}_{it-1}^* | d = 1) = (\bar{Y}_{it}^* - \bar{Y}_{it-1}^* | d = 0) \quad (3.4)$$

where  $\bar{Y}_{it-1}^* | d = 1$  is the average value of outcome variable for parents with 1-3 years old child and  $\bar{Y}_{it-1}^* | d = 0$  for parents with 3-6 years old child in a period before the reform.

Our estimator is then defined as follows:

$$\hat{\mathbf{a}} = (\bar{Y}_{it}^{**} - \bar{Y}_{it-1}^* | d = 1) - (\bar{Y}_{it}^* - \bar{Y}_{it-1}^* | d = 0) \quad (3.5)$$

To calculate  $\hat{\mathbf{a}}$ , we run a regression on the following equation:

$$Y = \mathbf{b}_0 + \mathbf{b}_1 d_1 + \mathbf{b}_2 d_2 + \mathbf{b}_3 d_1 d_2 + \mathbf{m} \quad (3.6)$$

where  $d_1 = 1$  if parents have a child of age 1-3;  $d_1 = 0$  if parents have a child of age 3-6;  $d_2 = 1$  if the time period is after the reform;  $d_2 = 0$  if the time period is before the reform.

By plugging (3.6) into (3.5) we get:

$$\hat{\mathbf{a}} = (\mathbf{b}_0 + \mathbf{b}_1 + \mathbf{b}_2 + \mathbf{b}_3 - \mathbf{b}_0 - \mathbf{b}_1) - (\mathbf{b}_0 + \mathbf{b}_2 - \mathbf{b}_0) = \mathbf{b}_3 \quad (3.7)$$

To estimate the effect of cash benefit reform in association with education level of women, we run a regression on the following equation:

$$Y = \mathbf{b}_0 + \mathbf{b}_1 d_1 + \mathbf{b}_2 d_2 + \mathbf{b}_3 d_1 d_2 + \mathbf{g}_0 x_i + \mathbf{g}_1 d_1 x_i + \mathbf{g}_2 d_2 x_i + \mathbf{g}_3 d_1 d_2 x_i + v \quad (3.8)$$

where  $x_i=1$  if university level education;  $x_i=0$  if less than university level education; and the estimator of the effect of the reform if the university level education is equal to  $\mathbf{b}_3 + \mathbf{g}_3$ .

An alternative method is to stratify the whole sample with respect to women's education levels and then run regressions on equation (3.6) for each stratified sample. We would essentially get the same coefficients by using any of the two methods but standard errors may vary.

To control for other variables, we interact each and every variable in the same way as we interact education level and run a regression on the following equation:

$$Y = \mathbf{b}_0 + \mathbf{b}_1 d_1 + \mathbf{b}_2 d_2 + \mathbf{b}_3 d_1 d_2 + \mathbf{g}_0 x_i + \mathbf{g}_1 d_1 x_i + \mathbf{g}_2 d_2 x_i + \mathbf{g}_3 d_1 d_2 x_i + \mathbf{d}_1 d_1 y_i + \mathbf{d}_2 d_2 y_i + \mathbf{d}_3 d_2 y_i + \mathbf{h} \quad (3.9)$$

where  $y_i$  is the vector of control variables.

#### 4. Results

The main objective of our research is to evaluate the impact of the reform of 98 on specialisation, market intensity, and individual working hours of the Norwegian couples. For this purpose we run four regressions on equation (3.6): one for each outcome. Table 2 reports the after effects of the cash benefits reform.

We discussed in section 1 that the reform of 98 may increase specialisation among the working parents. Our results illustrate that our predictions holds for our sample. We find that due to cash benefits couples with children of age 1-3 increase specialisation, by 3.28 hours, and decrease market intensity by 2.42 hours per week.

[Table 2 about here]

Table 2 illustrates that wives' market work decreases and husbands' market work increases after the reform. The increase in husbands' market work is insignificant. We see that 87 percent of the increased specialisation is caused by a reduction in women's working hours. However, due to some increase in the husband's market work, fall in a couples' total market intensity remains lower than the decrease in wife's working hours.

An impact of any social program may differ for groups of individuals depending on their characteristics. We discussed in section 1 that mothers' schooling is one of the important determinants of specialisation and parents' total market intensity. We therefore explore the impact of the reform in association with mothers' schooling.

The household economic models predict a positive association between females' education and their market work leading to a lower level of specialisation between couples. Figure 1 illustrates the relationship between education and average working hours of women, who have 1-3 years old children, in our sample. Figure 2 illustrates the relationship between wives' education and level of specialisation among couples with 1-3 years old children. As expected we observe the positive relationship between women's education and labour force participation and negative relationship between women's education and level of couples' specialisation in a period before and even after the reform. Nevertheless the average working hours for educated women is lower and the level of specialisation is higher in a period after the reform as compared with a period before the reform.

[Figure 1 and 2 about here]

Our objective is to estimate the change in high and low educated women's labour force participation and households' specialisation caused by the cash benefits reform. For this purpose we run four regressions by interacting our dependent variables with dummies for mothers' education. The results are illustrated in Table 3.

[Table 3 about here]

We find that the reform affects not only the households where wives have less than university schooling but also the households where wives have higher schooling. The differences between the reform's effects for the two categories of household are statistically insignificant but we see the larger coefficients if wives' have university level education.

We find that households where wives have less than university schooling increase specialisation, by 2.48 hours whereas this increase is 5.06 hours in households where wives have university level education. Due to cash benefits women with less than university level schooling decrease their market work by 2.17 hours. This ratio is 4.28 hours for women with higher schooling. In short our findings indicate a clear and profound effect of the reform for households where wives have university level education. This contradicts a hypothesis claiming that women with lower level schooling will be more motivated by the cash benefits reform as compared with high level.

Controlling for age, working sector, number of children and husbands' education, does not change the basic pattern of the results but we get larger coefficients for all the outcome variables. We see that all control variables are statistically insignificant. F-tests show that the control variables are also jointly insignificant (results not shown). Therefore, we believe that results from running regressions without control variables are valid for interpretation.

## **5. Conclusion**

The main aim of this research was to evaluate the effect of the recent cash benefits reform on specialisation and individual working hours of the Norwegian couples. We find that, on average, women reduce their working hours after the reform, leading to an increase in specialisation between a husband and a wife and decrease in market intensity of the households. The increase in husbands' working hours is insignificant.

Another objective of this paper was to explore the effect of cash benefits in association with mothers' education. We find that all women reduce their working hours after the reform,

leading to an increase in specialisation between a husband and a wife but the effect is stronger for mothers who have higher education as compared with mothers who have less than university schooling. This result contradicts a hypothesis claiming that women with lower level schooling will be more motivated by the cash benefits as compared with high level.

In section 1, we mentioned that tax wedge between home production and market work may cause too little production in the labour market. Public provision of day care may increase efficiency in the economy by stimulating labour force participation of women. We find that the cash benefits reform reduces market work of all women and especially of highly educated women. Due to decrease in the supply of skilled labour, the market production may decrease substantially. Hence, the cash benefits reform may produce efficiency losses if it causes too little production of market work by drawing educated women out of the labour force.

We find that mainly wives reduce their labour force participation after the reform and not husbands. This suggests that the cash benefits reform leads to reversal in the development towards equal status for men and women in the labour market. Aside from short-term loss of income, the time off from paid work may also influence wages and career in the long run, and finally the mothers' pensions.

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**Table 1: Mean and Standard Deviations**

Variable	Mean	S.Dev
<b>Wife's education (more than 12 years of schooling= university)</b>	2.37	0.67
If Wife's education university (38 % of total number)	3.13	0.33
If Wife's education not university (62 % of total number)	1.91	0.29
<b>Husband's education(more than 12 years of schooling= university)</b>	2.42	0.99
If Wife's education university	2.94	1.00
If Wife's education not university	2.11	0.85
<b>Wife's Working hours (Per Week)</b>	24.90	15.19
If Wife's education university	29.68	12.92
If Wife's education not university	21.98	15.73
<b>Husband's working hours (Per Week)</b>	41.15	11.35
If Wife's education university	41.14	10.10
If Wife's education not university	41.16	12.05
<b>Specialisation (Husband's working hours-Wife's working hours)</b>	16.25	18.85
If Wife's education university	11.46	16.55
If Wife's education not university	19.18	19.56
<b>Market Intensity (Husband's working hours+Wife's working hours)</b>	66.05	19.07
If Wife's education university	70.82	16.24
If Wife's education not university	63.14	20.06
<b>Wife's last year's income (in hundreds)</b>	175.30	136.12
If Wife's education university	223.52	151.06
If Wife's education not university	145.87	116.77
<b>Husband's last year's income (in hundreds)</b>	282.78	144.93
If Wife's education university	315.59	180.60
If Wife's education not university	262.75	113.43
<b>Number of children</b>	1.47	0.62
If Wife's education university	1.52	0.63
If Wife's education not university	1.43	0.61
<b>Wife's age</b>	32.13	4.98
If Wife's education university	33.63	4.44
If Wife's education not university	31.21	5.08
<b>Dummy if Wife works in the health Sector</b>	0.21	0.41
If Wife's education university	0.28	0.44
If Wife's education not university	0.17	0.37
<b>Amount of Cash Benefits received per couple</b>	1485	1170
If Wife's education university	1327	1183
If Wife's education not university	1585	1151

**Table2: Effect of Cash Benefits on Specialisation and Market Intensity**

Variables	$b_0$	t ratio	$b_3$	t ratio
Specialisation	16.18	21.97	3.28	2.75
Market Intensity	65.63	87.89	-2.42	-2.00
Wife's working hours	24.73	41.65	-2.85	-2.97
Husband's working hours	40.90	92.02	0.43	0.60
Number of Observations			4382	

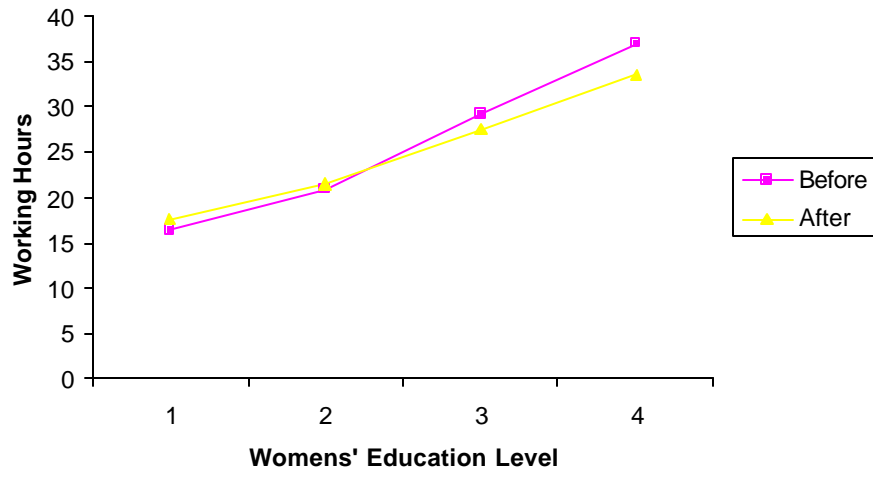
$b_0$  ° constant;  $b_3$  ° reform's effect

**Table3: Difference in the Effect of Cash Benefits With respect to Wife's Education Level**

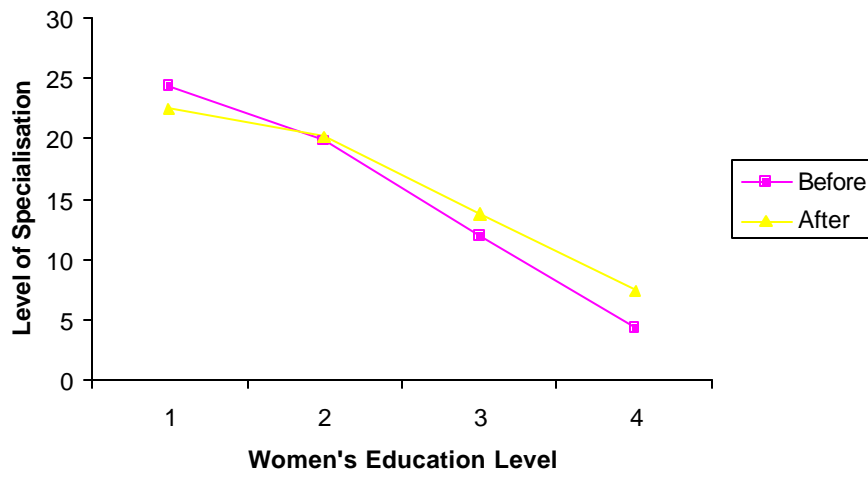
Variables	$b_0$	$g_0$	$b_3$	$g_3$	$b_3 + g_3$	$d_3$
<b>Specialisation</b>						
No Control Variables	18.73 (20.30)	-6.57 (-4.44)	2.43 (1.64)	2.63 (1.09)	5.06 (2.68)	
With Control Variables	19.35 (13.34)	-6.81 (-4.09)	3.63 (1.65)	2.00 (0.74)	5.63 (1.75)	
If Husband's Education University						2.29 (0.87)
# of Children>2						-0.15 (-0.03)
Works in the Health Sector						-1.19 (-0.41)
Wife's Age>30						-2.65 (-1.04)
<b>Market Intensity</b>						
No Control Variables	62.63 (66.94)	7.72 (5.14)	-1.90 (-1.26)	-1.59 (-0.65)	-3.49 (-1.82)	
With Control Variables	61.55 (41.85)	6.88 (4.08)	-4.60 (-2.05)	-2.82 (-1.04)	-7.42 (-2.27)	
Husband's Education University						2.33 (0.87)
# of Children>2						5.62 (0.94)
Works in the Health Sector						2.53 (0.86)
Wife's Age>30						1.62 (0.63)
<b>Wife's working hours</b>						
No Control Variables	21.95 (29.87)	7.15 (6.06)	-2.17 (-1.83)	-2.11 (-1.10)	-4.28 (-2.84)	
With Control Variables	21.10 (18.28)	6.85 (5.17)	-4.12 (-2.34)	-2.41 (-1.13)	-6.53 (-2.54)	
Husband's Education University						0.02 (0.01)
# of Children>2						2.89 (0.61)
Works in the Health Sector						1.87 (0.81)
Wife's Age>30						2.14 (1.05)
<b>Husband's working hours</b>						
No Control Variables	40.68 (71.57)	0.58 (0.63)	0.27 (0.29)	0.52 (1.35)	0.79 (0.68)	
With Control Variables	40.45 (45.16)	0.04 (0.04)	-0.48 (-0.35)	-0.41 (-0.25)	-0.89 (-0.45)	
Husband's Education University						2.31 (1.42)
Children>2						2.73 (0.75)
Works in the Health Sector						0.67 (0.38)
Wife's Age>30						-0.52 (-0.04)

$t$  ratio in parenthesis;  $b_0$  ° constant for low education level;  $b_0 + g_0$  ° constant for high education level;  $b_3$  ° reform's effect on low educated;  $g_3$  ° difference in the effect of the reform for low and high educated;  $b_3 + g_3$  ° reform's effect on high educated;  $d_3$  ° coefficients for control variables.

**Figure 1**



**Figure 2**



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