What does the stork bring to women's working career?

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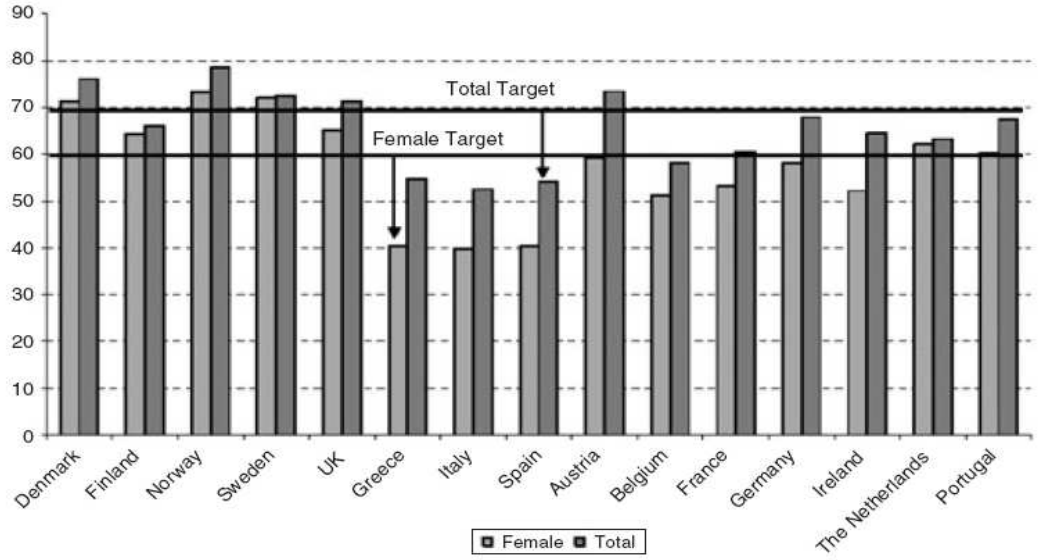
Abstract

We analyse the effects of motherhood on women's working career using WHIP, a unique database that records individual work histories and wages together with childbearing events. We focus on two possible penalties on after motherhood: the career break job penalty and the downward occupational mobility with respect to wages. With respect to the first penalty, we find a significant increase in the probability of transition from employment to non-employment for new mothers (about 6.5% on average). With respect to wages, we find no significantly negative effect of motherhood, once we condition on career and job characteristics (experience, tenure, occupation, kind of contract, firm size). This is expected, as it is exactly the provision of collective contracts (same pay for the same job). The next step of the research will endogenise career and job characteristics, to highlight if an adverse selection into career progression penalizes mothers.

1. Motivation

The increase in Italian women's participation to the labour market over the last thirty years represents undoubtedly a relevant phenomenon for its economic and social impact. Even if female participation rate is still below the European average and quite far from the Lisbon target (Figure 1), the increase in the percentage of working women made it necessary for the national and local governments to promote policies and services to make work and family responsibilities compatible. However, base (fully paid) maternity leave is relatively short (5 months) and optional maternity leave poorly paid (Del Boca and Pasqua, 2004 and 2005), part-time job opportunities are still quite limited (Del Boca, Pasqua and Pronzato, 2005) and most of the Italian regions (especially in the South) still lack of an adequate childcare provision (Del Boca, 2002). As a consequence the increase in female employment rate produced a decline in the Italian total fertility rate, that reached its minimum value of 1.2 in 2000. Due to the economic relevance of fertility decline, most of the literature on women's work in Italy analyses the possible relations between women's participation to the labour market and fertility decisions. Little attention, on the contrary, has been devoted to the consequences of motherhood on women's working career.

Figure 1. Male and female distance from Lisbon target, 2000



Source: Boeri *et al.* (2005).

When we analyse the effect of motherhood on women's working career, we have to consider two main forms of employment penalty: *career break job penalty* and *downward occupational mobility* (Gutierrez-Domenech, 2002). *Career break job penalty* refers to the permanent or temporary transition of working mothers to non-employment. Women that stay out of the labour market for some years experience a loss in their human capital; when they want to re-enter the labour market they can often access less qualified positions only. Moreover, in the areas where the unemployment rate is high, women may find it difficult to re-enter in the labour market altogether. This may induce women to prolong as much as possible the maternity leave, instead of quitting their job to look for another one in the future. When mothers do not leave their job, they may experience a *downward occupational mobility*: women with children are penalised with respect to non-mothers in their career advancements and wages. This is related to working mothers' actual or supposed lower effort in work activities (reduced availability for overtime work or travelling, increased absence due to children's illness[1]). Moreover, many women with children choose to work part-time, that implies fewer career opportunities subsequent difficulty in moving back to full-time employment. All this may impact negatively on mothers' average wage (in the literature this is known as *family wage gap*).

In Italy, to the best of our knowledge, very few analyses on this topic are available, if any, due to the lack of suitable data. The ISTAT Birth Sample Survey (2002) was conducted on a sample of mothers interviewed 18-21 months after delivery. It collects data on mothers' working conditions before and after childbearing, however no information on wages is included. We use administrative data drawn from INPS (the Italian Institute for Social Security) archives and processed in a public-use file known as the Worker History Italian Panel (WHIP) by LABORatorio R. Revelli[2]. WHIP represents a unique source for studying the interaction between motherhood, mothers' participation to labour market and mothers' wages. It also allows to compare easily mothers, non-mothers and men.

The paper is organised as follows: Section 2 contains a review of the relevant literature, section 3 describes the dataset used, section 4 presents the empirical strategy and the results. Conclusions follow.

[1] Italian legislation on optional parental leave allows one of the parents to stay at home to take care of the ill child. In this case no wage is paid either by the employer or by the social security institute.
[2] Full details on the WHIP archive can be found at www.laboratoriorevelli.it/whip.

2. Related Literature

Several studies carried out for different European countries have analysed employment decisions of women after childbirth. Pronzato (2006) reports that in Europe only 25% of mothers return to work before the child is one year old, while, when child ages, large differences emerge among countries. The decision of leaving the labour market is mainly linked to the level of human capital of the working women: more skilled women, with better jobs and higher opportunity costs tend to remain attached to work (Desai and Waite, 1991, Gustaffson *et al.*, 1996 and Gutièrrez-Domènech, 2005b).

However, human capital explains only in part mothers' employment decision after childbirth. In fact, where childcare services are available, affordable and of good quality (mainly in Northern European countries), it is easier for women to reconcile work and family responsibilities and therefore it is more likely that they stay attached to the labour market (Gutièrrez-Domènech, 2005b). Wetzels (2001) compares mothers' labour market behaviour in Germany, the U.K., the Netherlands and Sweden and she finds an important relationship between the country specific policy and the timing of re-entry. Generosity of the parental leave policies (in particular length of optional leave and replacement rate) seems to be crucial in increasing the probability of re-entering of new-mothers (Rönsen and Sunström, 1996, Pronzato, 2005). Saurel-Cubizolles *et al.* (1999) analyse the employment decisions after childbirth in France, Italy and Spain and they find that in Italy and France, where optional parental leave is longer compared to Spain, around 80% of women return to work, while in Spain only 53% of new-mothers return to work.

Women that remain in the labour market after childbirth may be penalised in terms of career opportunities and wages. Harkness and Walfogel (2003) use the LIS (Luxemburg Income Study) for seven countries and find that after controlling for earnings-related characteristics, a negative effect of children on women's wage exists in all countries considered and it is largest in the U.K., followed by the other Anglo-American countries and Germany, while it is smallest in the Nordic countries. Italy is not included in this comparative study.

The previous literature identifies four main explanations for the *family wage gap* (Wetzels, 2005):

1. *Heterogeneity in the 'commitment to work' and in 'career motivation'*: women that want to have children are more likely to choose jobs with more suitable working conditions, in particular for what time and place of working are concerned. The costs of this choice can be a lower wage and less career opportunities for working mothers (Gronau, 1988). However, Waldfogel (1995, 1997) for the U.S. finds that controlling for unobserved heterogeneity do not reduce the estimated child penalty and therefore, she concludes, differences in motivation and attitudes cannot explain alone the family wage gap. On the

contrary, Datta Gupta and Smith (2002) using Danish data find that using panel estimator controlling for unobserved heterogeneity and self-selectivity the negative effect of children on women's wages disappears.

2. *Human capital depreciation due to breaks*: working mothers' human capital depreciated during the periods of break due to childbearing and childrearing, also because of the lower training received. This can explain the lower hourly wage of women that spent some periods out of the labour market. Waldfogel (1995) for the U.S. and Joshi *et al.* (1999) for the U.K. show how human capital plays an important part in explaining the wage differential between mothers and non-mothers. On the contrary, Albrecht *et al.* (1999) for Sweden find a negative effects of time out (but not of maternity leave) on women's subsequent wages, but the differences in the penalty due to break are different for men and women and therefore human capital depreciation hypothesis cannot explain alone the family wage gap. Datta Gupta and Smith (2003) show that the negative effect on women's human capita of motherhood is only temporary and no long-term family wage gap exists in Denmark. Moreover, employers may consider breaks (especially when prolonged beyond the base leave period) as a signal of less work commitment, with negative effects on career and wage (Mavromaras and Rudolph, 1997)

3. *Reduce effort of working mothers*: due to family responsibility and extra household production and caring activities, mothers' effort in working activities is lower (or perceived as lower by the employers) compared to the effort of non-mothers. This hypothesis is not easily testable using the typical data available to the researchers. However, Anderson *et al.* (2000) use children age in their wage equation and they show that when children grow up the negative effect of their presence on the mother's wage is reduced probably because older children are less time and energy demanding for their mothers.

4. *New mothers look for better job conditions*: while in point 1 the choice of a job with more suitable working condition is taken *ex-ante* with respect to childbirth, here the decision is *ex-post*. Mothers are more likely to reduce the number of hours worked and to look for a more flexible job or a job in a place closer to home. Joshi *et al.* (1999) for the U.K. find that no pay penalty for mothers emerges within the group of full-time workers or within the group of part-time workers, but mothers that pass from full-time to part-time suffer a relevant wage penalty. Similarly, in Walfogel (1997) part-time employment is an important component in explaining the family gap in pay. Also Wetzels and Zorlu (2003) emphasise the effect of selection into less demanding jobs in explaining wage differential between mothers and non mothers.

3. The data

WHIP original source is the INPS (the Italian Institute for Social Security) database. It is processed in a public-use file by LABORatorio R. Revelli. WHIP spans the period 1985 to 2001. It draws randomly a 1:90 sample from the population of those who have worked in Italy as employees or self employed or received income support by INPS. For each of these people all their working career is observed. Only the public sector and selected professions (e.g. lawyers) are excluded. In this work we use the dependent employment section of WHIP, which is a Linked Employer Employee Database.

In this database a variable signals whether the worker received a maternity benefit[3]. Descriptive statistics from WHIP are consistent with the 2002 ISTAT survey: in 1999 WHIP records about 1800 women receiving maternity benefits, representing about 170.000 births; ISTAT surveys about 175.000 births from women that are employed in the private sector between 2000 and 2001.

In our empirical analysis, we further select women aged less than 45 employed in 1998. Some of them are observed in maternity leave in 1999, i.e. they have a child around that year. We then look at the employment situation of the whole group of women two years after, in 2001, i.e. after the end of the maternity leave (Table 1 details the sample size). Non mothers act as a control group, after allowing for endogenous selection into motherhood. In this way we focus on short-term effects of childbearing. In the near future, we intend to extend the analysis to the long term effects.

Table 1: sample size

	All aged < 45		In maternity leave in 1999	
Women aged < 45 employed in 1998	30,083		1,047	(3.5%)
Employed in 2001	24,995	(83.1%)	858	(81.9%)
Out of dependent employment in 2001	5,088	(16.9%)	189	(18.1%)

[3] Fully-paid maternity leave in Italy for dependent employed women last for 5 months. Then women can chose an optional maternity leave of 6 months. Women must take at least one month of maternity leave before the delivery.

4. Empirical analysis

4.1. Probability of Motherhood

Before focusing on career penalties we briefly detail observed determinants of fertility decisions. There is a positive effect of age on childbearing up to 29 years, then negative. The stability of the job, measured by elapsed tenure, plays an important role: the probability of having a child increases with tenure[4]. This result is consistent with De La Rica and Iza (2005) findings for Spain; temporary contracts delay marriage and parenthood due to uncertainty on future economic perspectives[5]. For lower educated women, as measured by occupation and wage, it is the low income and the higher risk of precariousness to induce them to postpone maternity. The lack of public childcare services, the high cost of private ones increases in fact the cost of having children. This helps to explain also the positive sign of the variable related to the local level of unemployment: a higher unemployment rate makes it more difficult to re-enter employment after a break due to childrearing. As expected, women already holding jobs that help conciliating work and family (e.g. part-time) are more likely to have child[6]. Spells of health related leave having a positive impact on motherhood probably capture pregnancy related events. Having already a child also increases the probability of childbearing, capturing the effect of unobserved individual preferences for motherhood.

Table 2: Probability of having a child in 1999 for employed women in 1998

	Marginal effect
Age	0.026
Age^2 / 100	-0.045
Elapsed tenure up to 13 years	0.0001
Dummy on elapsed tenure >13 years	-0.013
Atypical contract	ns
Part time contract	0.005
Blue collars	-0.002
Low skill white collars	Omitted

[4] On the contrary, very long elapsed tenure captures the effect of older age.
[5] In our regression temporary contract have a non significant effect on motherhood, maybe due to the small number of cases.
[6] Most of the public kindergartens have opening hours incompatible with full-time jobs, hence women need relatives or babysitters to reconcile work and motherhood.

High skill white collars	0.020
Log firm size	ns
Log wage	0.004
Has already a child	0.010
Unemployment rate	-0.001
Spell of temporary layoff	ns
Spell of health related leave	0.020

Note: Probit regression. Additional controls for industry branch and geographical area. Robust standard errors. All reported marginal effects are significant at 99% confidence level. All controls referred to 1998. Number of obs = 28,804. Wald chi2(27) = 551.36 (Prob > chi2 = 0.0000).

4.2. Career break job penalty

In Table 1 it appears that transition out of the employment is more likely for women after childbearing: on average more than 18% of women employed before the birth of their child are non-employed two years after, with respect to an average 16.9% in the sample. Table 3 details the statistic by area, occupation and age. Exiting employment after motherhood is more likely among young women (23.9%), blue collars (24.7%) and in the South of Italy (23.3%), as expected. However, if we compare the exit probability of mothers and non-mothers we notice that in the South of Italy mothers exit less than non mothers. This because in regions where female employment rate is low working women are more selected and more attached to their job. In general, the fact that non-employment includes both housework and unemployment is important to interpret the transitions. I.e., where female unemployment rate is high, a larger share of exits are due to involuntarily unemployed mothers, not only to home-oriented women. It is also worth noting that, even if in theory exit could mean "hired in the public sector", the event is quite unlikely, as after the year 2000 total employment in the public sector has been actually decreasing.

Table 3: Transitions employment vs. non-employment between 1999 and 2001

Age groups	**< 25**	**25-29**	**30-34**	**35-40**	**> 40**	**Total**
Women 2-years after child birth	23.9%	15.8%	19.4%	18.1%	0.0%	18.1%
All	19.5%	17.8%	16.8%	14.3%	13.8%	16.9%

Geographical area	North-west	North-est	Centre	South	Total
Women 2-years after child birth	15.6%	19.8%	17.4%	23.3%	18.1%
All	13.0%	14.7%	18.2%	29.1%	16.9%

Occupation	Blue collar	Low skill white collar	High skill white collar	Total
Women 2-years after child birth	24.7%	12.4%	8.3%	18.1%
All	21.1%	12.2%	7.1%	16.9%

The general descriptive picture points to some regularities in the career break job penalty. To deepen the analysis we estimate the probability of being out of dependent employment in 2001 for all women employed in 1998, including child birth in 1999 among the controls. We look at the exit two years after the birth since we assume that most of the women that had a child in 1999 were in maternity leave in 2000 and therefore their decision to re-enter or not the labour market is postponed to 2001, and we exclude from the analysis women on maternity leave in 2001:

$$exit_i = \alpha child_i + X_i\beta + u_i$$

X includes controls as detailed in Appendix A. u is i.i.d. normal. We work with a single cross section, although we observe the women repeatedly over time. We leave to the near future the control for unobserved heterogeneity.

Assuming exogenous maternity events, our results show that(Table 4), other things equal, the probability of exiting dependent employment increases by 0.065 for mothers with respect to non mothers, a non negligible affect (the average probability in the sample is 0.169). Controls have the expected sign (e.g. wage, tenure and firm size impact negatively on the probability of exiting employment; a low-skill qualification impacts positively; the same for a part-time contract, signalling probably a lower attachment to participation). We also test the hypothesis of exogenous maternity event, both in a probit framework and in a linear probability framework, where more tests are available. IV are age interacted with the area of birth of the woman (south) and having already a child interacted with the area of birth of the mother (north, south). In both cases we fail to reject the exogeneity assumption. The estimated coefficient in the two latter cases is not significantly different from zero, as we loose efficiency.

Table 4: Probability of exiting employment in 2001 for women employed in 1998

	Coeff	Std.err	Z	Marginal eff.
Child_birth	0.241	0.0516	4.66	0.0652
Child_birth IV Probit (a)	0.244	1.5161	0.15	--
Child_birth Linear probability IV (b)	0.059	0.3419	0.17	--

Note: Probit estimates. Robust s.e.

(a) Wald test of exogeneity: chi2(1)= 0.00 Prob > chi2 = 0.9982

(b) Anderson canon. corr. LR statistic (identification/IV relevance test): 39.597 (Chi-sq(6) P-val = 0.0000)

Sargan statistic (overidentification test of all instruments): 6.710 (Chi-sq(5) P-val = 0.2431)

H0: Regressor is exogenous:

Wu-Hausman F test: 0.00003 F(1,26480) P-value = 0.99537

Durbin-Wu-Hausman chi-sq test: 0.00003 Chi-sq(1) P-value = 0.99537

4.3. Family Wage Gap

Downward occupational mobility is another type of job penalty linked to childbearing. There seems to be evidence also of this type of penalty for working women in Italy. Two years after the birth of a child, one out of five women move into part-time occupation, compared to an average transition rate from full to part time jobs of 7%, and it is well known that career prospects of part time jobs are more limited with respect to full time jobs. Also, the relative position of mothers' wages in the distribution, i.e. the share of women who move towards a lower decile of the wage distribution, is larger after childbearing (Table 5).

Table 5: Change in occupational status between 1999 and 2001

	Women 2-years after child birth	All
From full-time to part-time	21.4%	7.1%
% of women who undertake downward wage mobility between 1998 and 2001[7]	38.3%	31.2%

As descriptive statistics have shown, the child birth penalty on the working careers of women in Italy does not occur only through a job break, but also through a penalty for those who remain employed. To detect the effect of motherhood on wages we estimated a wage equation on those women still employed in 2001:

[7] We computed the deciles of the wage distribution in 1998 and 2001 and compare the relative position of women in the two years.

$$\ln W_i = \alpha\, child_i + X_i\beta + \varepsilon_i$$

W is the log weekly wage of individual i, X includes age (quadratic), occupation, type of contract, industry and geographical area of work, a dummy on temporary layoff or a health related leave spells, a spline on elapsed tenure and on firm size,.

The estimation of the wage equation may be affected by two possible sources of bias: 1) endogeneity of motherhood and 2) bias from selection into employment, as wages are only observed for working women, and in the previous section we have shown that the selection is non random with respect to motherhood.

We started with a simple OLS regression in which child birth results to have a negative but not significant effect on wages. Then we proceed by controlling in turn for the two sources of biases, performing an IV regression and an Heckman selection procedure separately and then simultaneously[8]. The selection equation is given by individual and job characteristics in 1998; the correction term is significant in the wage equation. IV are dummies on age interacted with area of birth of the woman (north, south). In this case we can reject the exogeneity of motherhood, while the chosen IV appear to be valid.

In all specifications individual and job characteristics have the expected sign (see appendix B). The effect of child birth on women's wage is in Table 6: it is never significantly different from zero.

Table 6: Effect of child birth on wage

	Coeff.	Std. Err	P>|t|
OLS log wage equation	.0093	.0105	0.377
IV log wage equation (a)	.0468	.1281	0.715
Lwage equation with selection (b)	.0059	.0110	0.592
IV Lwage equation with selection (c)	.0505	.1241	0.684

Note:

a) Anderson canon. corr. LR statistic (identification/IV relevance test) 152.731 (P-val = 0.000). Sargan statistic: 77.462 (P-val = 0.0741)

b) Lambda = -.1895 (s.e. 0.00436). LR test of indep. eqns. (rho = 0) = 628.56 (Prob > chi2 = 0.000)

c) Anderson canon. corr. LR statistic (identification/IV relevance test): 145.951(P-val=0.000). Sargan statistic: 63.831(P-val=0.2490)

Hence, we find no significantly negative effect of motherhood, once we condition on career and job characteristics. This may be expected, as it is exactly the provision of collective

[8] Notice however that the IV model with the Heckman correction for selection (2 steps Heckman method) does not correct s.e. for the presence of the estimated inverse Mills ratio.

contracts (same pay for the same job). The next step of the research will endogenise career and job characteristics, to highlight if an adverse selection into career progression penalizes mothers.

5. Conclusions

Italy is characterised by a low gender wage differential[9]; our preliminary results show that conditioning on the relevant characteristics of the job held (tenure, occupation and so on) Italian women experience no unit wage penalisation. This is not true in terms of career advancements after motherhood. Compared with childless women, mothers are more likely to experience transition to non-employment, to part time jobs and to loose ground in the wage distribution in the years after childbirth.

Therefore, our preliminary results seem to confirm that social policies to help women to conciliate work and family (availability and affordability of childcare, incentive to fathers to take parental leave, working hours reduction, more flexibility in working time and in the opening hours of shops and public offices) are not only useful to increase female employment without reducing fertility, but they may also reduce employment penalty after motherhood.

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[9] The relevant role played by trade unions during the 70s and 80s, in fact, reduced the inequalities in wage distribution, and this helped to keep gender wage gap very small.

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7. Appendix

APPENDIX A

Probit regression — Number of obs = 26504; LR chi2(22) = 1806.26; Prob > chi2 = 0.0000; Log likelihood = -11560.73; Pseudo R2 = 0.0725

out_2001	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
atypical c.	-.030688	.0426841	-0.72	0.472	-.1143474	.0529713
part time	.1517253	.0225681	6.72	0.000	.1074927	.195958
age	.0442662	.0127952	3.46	0.001	.0191881	.0693442
age^2	-.0696435	.0202456	-3.44	0.001	-.1093241	-.0299628
tenure	-.0040898	.0002322	-17.61	0.000	-.0045449	-.0036346
north west	.0205261	.0240574	0.85	0.394	-.0266256	.0676777
centre	.1365242	.0265441	5.14	0.000	.0844986	.1885497
south	.416139	.0280207	14.85	0.000	.3612195	.4710585
apprentice	-.00934	.0452348	-0.21	0.836	-.0979985	.0793185
blue collar	.2047777	.0221452	9.25	0.000	.1613739	.2481816
h_skill_white	.087353	.1610328	0.54	0.588	-.2282654	.4029715
lfirm size	-.0355225	.0043198	-8.22	0.000	-.0439892	-.0270559
lwage	-.2175979	.0198214	-10.98	0.000	-.2564472	-.1787486
child birth	.2408216	.0516312	4.66	0.000	.1396262	.342017
_cons	-.4760357	.2230608	-2.13	0.033	-.9132269	.0388446

+ industry branch dummies.

APPENDIX B

Wage regression

lwage	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
child_birth	-.0468463	.1281529	-0.37	0.715	-.2980214	.2043288
age	.0230852	.0037298	6.19	0.000	.0157749	.0303955
age^2	-.0245903	.0056093	-4.38	0.000	-.0355843	-.0135962
tenure4_6	.0176883	.0061535	2.87	0.004	.0056277	.0297489
tenure7_9	.0321385	.0082843	3.88	0.000	.0159015	.0483755
tenure_over9	.080889	.0072254	11.20	0.000	.0667274	.0950506
apprentice	-.3731667	.009903	-37.68	0.000	-.3925762	-.3537572
blue collar	-.2839643	.0041523	-68.39	0.000	-.2921027	-.275826
h_skill_white	.5234719	.0166321	31.47	0.000	.4908735	.5560702
manager	.6177203	.0949391	6.51	0.000	.4316431	.8037976
atypical	-.0305848	.008203	-3.73	0.000	-.0466624	-.0145072
ptime	-.0543868	.0067436	-8.06	0.000	-.067604	-.0411695
fixed_end c.	-.062824	.0071095	-8.84	0.000	-.0767585	-.0488896
temporary lay	-.0230942	.0112561	-2.05	0.040	-.0451558	-.0010327
ill_ leave	-.0549903	.0051312	-10.72	0.000	-.0650473	-.0449334
north west	-.0202325	.0043408	-4.66	0.000	-.0287402	-.0117247
centre	-.0411737	.0050486	-8.16	0.000	-.0510687	-.0312787
south	-.1263113	.0059183	-21.34	0.000	-.1379109	-.1147117
size 20_200	.0805406	.0052361	15.38	0.000	.0702781	.0908032
size 200_1000	.1306449	.0065591	19.92	0.000	.1177894	.1435004
size over1000	.2223823	.0068388	32.52	0.000	.2089785	.235786
_cons	6.10815	.0587295	104.00	0.000	5.993042	6.223257

+ industry branch dummies.

Anderson canon. corr. LR statistic (identification/IV relevance test): 152.731
Chi-sq(61) P-val = 0.0000

Sargan statistic (overidentification test of all instruments): 77.462
Chi-sq(60) P-val = 0.0641

Heckman selection model
(regression model with sample selection)

Number of obs = 26504
Censored obs = 4751
Uncensored obs = 21753

Wald chi2(30) = 12377.33
Log likelihood = -12441.16 Prob > chi2 = 0.0000

lwage	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
child_birth	.0059261	.0110532	0.54	0.592	-.0157379	.02759
age	.0256935	.0026718	9.62	0.000	.0204568	.0309303
age^2	-.0287304	.0038569	-7.45	0.000	-.0362898	-.021171
tenure4_6	.0063516	.0058963	1.08	0.281	-.005205	.0179082
tenure7_9	.0046931	.0071148	0.66	0.509	-.0092516	.0186378
tenure_over9	.0502636	.0063946	7.86	0.000	.0377305	.0627968
apprentice	-.3516602	.0099538	-35.33	0.000	-.3711693	-.3321511
blue collar	-.2634687	.0042169	-62.48	0.000	-.2717337	-.2552038
h_skill_white	.513803	.0170952	30.06	0.000	.4802969	.547309
manager	.7291002	.0929636	7.84	0.000	.5468949	.9113056
atypical	-.0255763	.007958	-3.21	0.001	-.0411737	-.0099789
ptime	-.0401956	.0044127	-9.11	0.000	-.0488443	-.0315469
fixed_end c.	-.0484271	.0069701	-6.95	0.000	-.0620883	-.0347659
temporary lay	-.0349567	.0111577	-3.13	0.002	-.0568254	-.0130881
ill_ leave	-.0574547	.0050385	-11.40	0.000	-.0673301	-.0475794
north west	-.0192162	.0045505	-4.22	0.000	-.028135	-.0102973
centre	-.0302804	.0052306	-5.79	0.000	-.0405322	-.0200287
south	-.089827	.0062395	-14.40	0.000	-.1020563	-.0775978
size 20_200	.0751877	.005139	14.63	0.000	.0651154	.08526

```
size 200_1000|    .11845   .0065716    18.02   0.000     .1055699    .1313301
size over1000|  .2021537   .0069935    28.91   0.000     .1884467    .2158607
       _cons |  6.110869   .0456835   133.77   0.000     6.021331    6.200407
-------------------------------------------------------------
selection equation
work. weeks  |   .0194164   .0006504    29.85   0.000     .0181417    .0206911
trainin contr|   .0057174   .0406959     0.14   0.888     -.074045    .0854798
atypical     |  -.0339691   .0397369    -0.85   0.393     -.111852    .0439138
temporary    |  -.2006474   .2150789    -0.93   0.351    -.6221943    .2208995
part time    |   .1281826   .0238253     5.38   0.000     .0814858    .1748795
    age      |   -.082431   .0127971    -6.44   0.000    -.1075128   -.0573492
  age^2      |   .1242434   .0202573     6.13   0.000     .0845398     .163947
 tenure      |   .0003061   .0002454     1.25   0.212    -.0001749    .0007871
  north west |  -.0010881   .0239876    -0.05   0.964     -.048103    .0459267
    centre   |  -.0614259    .026587    -2.31   0.021    -.1135355   -.0093163
    south    |  -.2964439   .0283289   -10.46   0.000    -.3519676   -.2409202
apprentice   |    .080969    .043633     1.86   0.063    -.0045501    .1664881
blue collar  |  -.1098487   .0219682    -5.00   0.000    -.1529056   -.0667918
h_skill_white|  -.0736294   .1548945    -0.48   0.635     -.377217    .2299582
manager      |  -1.734995   .3509489    -4.94   0.000    -2.422842   -1.047147
   lfirm size|   .0465137   .0124417     3.74   0.000     .0221285     .070899
 lfirm size^2|   .0318905   .1406865     0.23   0.821    -.2438499    .3076309
  lwage_1998 |   .3802835   .0172108    22.10   0.000     .3465509    .4140161
   has_child |   .0400855   .0290313     1.38   0.167    -.0168148    .0969857
child_birth  |  -.3544723    .051042    -6.94   0.000    -.4545128   -.2544318
       _cons |    -.61584   .2171492    -2.84   0.005    -1.041445   -.1902353
-------------+-----------------------------------------------------------------
     /athrho |  -.8118759   .0228581   -35.52   0.000    -.8566769   -.7670749
    /lnsigma |  -1.263529   .0061098  -206.81   0.000    -1.275504   -1.251554
-------------+-----------------------------------------------------------------
         rho |  -.6706238    .012578                     -.6945415   -.6452253
       sigma |   .2826547    .001727                      .2792901    .2860598
      lambda |  -.1895549   .0043672                     -.1981145   -.1809953
------------------------------------------------------------------------------
LR test of indep. eqns. (rho = 0):   chi2(1) =   628.56   Prob > chi2 = 0.0000
------------------------------------------------------------------------------


Instrumental variables (2SLS) regression
----------------------------------------
                                                Number of obs =    21753
                                                F( 34, 21718) =   614.62
                                                Prob > F      =   0.0000
Total (centered) SS     =  2654.317925          Centered R2   =   0.4907
Total (uncentered) SS   =  909797.3101          Uncentered R2 =   0.9985
Residual SS             =  1351.904448          Root MSE      =    .2493

------------------------------------------------------------------------------
       lwage |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
child_birth  |   .0505121   .1241466     0.41   0.684    -.1928108     .293835
         age |   .0384323   .0031635    12.15   0.000     .0322321    .0446326
       age^2 |  -.0515267    .004656   -11.07   0.000    -.0606523   -.0424012
   tenure4_6 |   .0335412   .0058173     5.77   0.000     .0221396    .0449429
   tenure7_9 |   .0020939   .0082899     0.25   0.801     -.014154    .0183418
tenure_over9 |  -.0632061   .0102077    -6.19   0.000    -.0832129   -.0431993
 apprentice  |  -.3021947   .0102096   -29.60   0.000    -.3222051   -.2821843
 blue collar |  -.1876569   .0058733   -31.95   0.000    -.1991684   -.1761453
h_skill_white|    .458324   .0160691    28.52   0.000     .4268292    .4898188
   manager   |   .8272596   .0886181     9.34   0.000     .6535713    1.000948
trainin cont |   .0259972   .0150118     1.73   0.083    -.0034253    .0554197
    atypical |  -.0491024   .0099795    -4.92   0.000    -.0686618    -.029543
temporary c. |    .021303   .0208048     1.02   0.306    -.0194736    .0620796
   part time |  -.0065126   .0053785    -1.21   0.226    -.0170543    .0040291
fixed end c. |  -.0529984   .0073371    -7.22   0.000    -.0673788   -.0386181
temp.layoff  |  -.0401175   .0106607    -3.76   0.000    -.0610121   -.0192229
ill leave    |  -.0513211   .0048814   -10.51   0.000    -.0608886   -.0417537
```

```
  north west |  -.0045566   .0041933    -1.09   0.277    -.0127754    .0036622
      centre |   .0216907    .005655     3.84   0.000     .0106072    .0327743
       south |   .0347069   .0087401     3.97   0.000     .0175765    .0518372
 size 20_200 |    .044732   .0054152     8.26   0.000     .0341183    .0553456
size200_1000 |   .0638103   .0065275     9.78   0.000     .0510167     .076604
size_over1000|    .128125   .0074267    17.25   0.000      .113569    .1426811
   has_child |   .0004039   .0056106     0.07   0.943    -.0105926    .0114004
      lambda |   .4461068   .0173539    25.71   0.000     .4120938    .4801198
       _cons |   5.167714   .0474978   108.80   0.000      5.07462    5.260808
------------------------------------------------------------------------------
Anderson canon. corr. LR statistic (identification/IV relevance test): 145.951
                                                      Chi-sq(58) P-val =   0.0000
------------------------------------------------------------------------------
Sargan statistic (overidentification test of all instruments):          63.831
                                                      Chi-sq(57) P-val =   0.2490
```