Liquidity constraints and labor supply*

Mariacristina Rossi† Serena Trucchi‡

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Abstract

In this paper we show how liquidity constraints shape Italian households' decisions with regard to supplying their labor. One way to neutralize binding liquidity constraints is by resorting to supplying additional labor, instead of reducing consumption patterns. We estimate whether this channel is at work by using the Survey of Households Income and Wealth (SHIW) and exploiting its panel component. This allow to control for state dependence in the labor supply, individual unobserved heterogeneity and the endogeneity of our measure for credit constraints in labor supply equations. Our results show that liquidity constraints increase the intensity in the supply of women's labor and foster their participation in the labor force. The former effect is observed immediately, while participation takes more time to adjust to credit constraints. We do not find any significant effect on men's labor supply.

Key words: Labor supply, liquidity constraints, life cycle, panel data.
JEL: A, D4, JE.

1 Introduction and motivation

Imperfections in how credit markets function have occupied a substantial part of the economic literature to explain why households make suboptimal choices. In the literature of life cycle consumption, liquidity constraints

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†University of Turin and CeRP-Collegio Carlo Alberto. Address: via Real Collegio 30, 10024 Moncalieri (To), Italy. Phone: 0039 0116705054. Fax: 0039 011 6705042. Email: mariacristina.rossi@unito.it.

‡University of Bologna and CeRP-Collegio Carlo Alberto. Address: piazza Scaravilli 2, 40126, Bologna, Italy. Phone: 0039 051 2098892. Email: serena.trucchi@unibo.it.

have been identified as one of the main causes for why the life-cycle model fails to explain the consumption behaviour of households (Attanasio and Weber, 2010; Deaton, 1992). The fact that household consumption tracks income too closely might be imputed to imperfections existing in the credit markets resulting in a lack of availability of credit. Households, expecting an increase in income, will delay an increase consumption until the actual increase in income occurs, because they are not allowed to borrow in order to incorporate the anticipated increase. Suboptimal choices are then made as the credit market is far from perfect.

Another channel that is likely to be affected by liquidity constraints is the labor market. One way to circumvent the obstacle of being unable to borrow is to simply supply more labor. Working more might (partially) neutralize the credit constraints. The literature on consumption has largely supposed that saving and borrowing are the only actors at work in smoothing out income fluctuations and keeping consumption stable. The underlying hypothesis is that the labor supplied tends to be fixed, either full time or nil. But this hypothesis is more difficult to prove. Labor supply may vary both at the intensive and, especially for women, at the extensive margin. The (traditional) second earner has shown a participation in the labor market that is more volatile (). Three papers by Bottazzi (2004); Del Boca and Lusardi (2003) and Fortin (1995) analyzed whether female participation is affected by having a mortgage in, respectively, the UK Italy and Canada. Households who have a mortgage might be more committed and, therefore, more inclined to participate to the job market in order to have a stable income. This effect is found for both countries with respect to women. Related papers investigate the role played by female labor supply in smoothing household consumption. Female labor supply has shown to play an important role in insuring permanent income shocks (Blundell et al., 2008), shocks to future earnings (Attanasio et al., 2005), unemployment risk (Ortigueira and Siassi, 2013) and financial shocks (Benito and Saleheen, 2013).

Our paper focuses on how financial imperfections might in fact be responsible for an additional labor supply that is provided as a way to mitigate these credit market problems. Liquidity constrained households do not have (full) access to the credit market, and this is likely to distort their choices about how much they consume and how much they work. In line with the literature, we define being liquidity constrained as the impossibility of resorting to debt. To investigate the effect of liquidity constraints on labor supply of Italian workers, we exploit the Survey on Household Income and Wealth (SHIW), a panel dataset collected by the Bank of Italy. We allow both participation to the labor market and the intensity of labor supply to exhibit state dependence and we do not restrict the individual unobserved heterogeneity to be uncorrelated with the explanatory variables. We estimate both the extensive and intensive margin using the Arellano and Bond (1991) GMM procedure and allowing for the endogeneity of the liquidity constrained variable.

Our findings suggest that liquidity constraints play an important role in shaping female labor supply. Women facing liquidity constraints increase the intensity of their labor supply, in the same year, by more than 8 hours per week (about 25% of the sample mean). The extensive margin of female labor supply takes more time to adjust: We do not detect a significant immediate effect, but constrained women are more likely to work two years after by 16-22 percentage points. On the contrary, we do not find evidence of a significant effect of liquidity constraints on the number of hours supplied by men.

The rest of the paper is organized as follows. Section 2 outlines the theoretical framework and derives the testable implication. Data and the empirical strategy are described, respectively, in sections 3 and 4. Section 5 illustrates the main findings for men and women and Section 6 concludes.

2 Conceptual Framework

To conceptualize the problem, we suppose for simplicity that agents live for two periods. In the first period the agent supplies labor and in the second period the agent retires. Utility is derived both from consumption and from leisure. However, the amount of leisure can be chosen only during the working life (period one) while during retirement it is exogenously fixed, as all the time available is devoted to leisure. The conceptual framework we use is a standard utility maximisation context where each individual maximises her utility under the budget constraint. For the sake of simplicity we also set to zero the interest rate and the subjective discount rate. Agents will maximise the following utility function:[1]

$$U = \sum_{t=1}^{2} u(c_t, l_t) = u(c_1, l_1) + u(c_2, L)$$

Supposing that the initial asset is zero and bequests are also zero, the following intertemporal budget constraint applies:

[1]More details about the model assumptions and solution are provided in the Appendix.

$$w(1-l_1)+Y_r=c_1+c_2$$

where w is the wage rate and Y_r is income at retirement. In period one consumption (c) and leisure (l) are set at their optimal level while in period two, corresponding to retirement, agents devote all their time to leisure (L).

Without market imperfections, and ignoring the constraint on hours, the marginal utility of consumption is kept equal over time, as well as the marginal utility of consumption in period one is set equal to the marginal utility of leisure. The first order conditions are as follows:

$$u'_c(c_1,l_1)-u'_c(c_2,L)=0$$
$$-wu'_{c_1}(c_1,l_1)+u'_{l_1}(c_1,l_1)=0$$

where u'_x is the marginal utility with respect of x. The first equation implies the usual smoothness of consumption marginal utility across time, while the second implies the equality between marginal utility of consumption and leisure, within the same period, scaled by the wage.

If a liquidity constraint is added to the model, agents are forced to borrow below a certain threshold, i.e. assets at the beginning of period two (A_2) must be greater than the threshold B:

$$A_2 \geq B.$$

If the constraint binds, individuals are forced to reduce their consumption in period one. The first period marginal utility will be higher than in the second period while the intra-period marginal utility of consumption and leisure are kept equal. Thus consumption and labor supply are characterized as follows (we denote with the upscript C the constrained case):

$$u'^C_{c_1}(w(1-l^C)+B,l^C)=\frac{u'^C_{l_1}(w(1-l^C)+B,l^C)}{w}>u'^C_{c_2}(c_2^C,L)$$

The last inequality indicates that the marginal utility of consumption in period two is lower than in period one, implying that second period consumption in period two be higher than in the unconstrained case. Consumption in period one is lower than without the constraint as borrowing is limited. If leisure are kept stable in period one as in the unconstrained case, the marginal utility of consumption does not equate that of leisure. To set the marginal utility of leisure equal to consumption within period one the agent has the only option to work more and reduce leisure.

Our testable implication is thus that the more the constraint becomes binding, the more the incentive to work more for the economic agent, as the only available way to offset the limited access to credit. The rest of the paper is centered on testing whether this prediction holds true.

3 Data

The empirical analysis is based on the Bank of Italy's Survey on Household Income and Wealth (SHIW) and relies on data for the years 1998-2010. This survey is collected every two years, it is a representative sample of the Italian resident population and covers about 8000 households in each wave. A household is defined as a group of individuals related by blood, marriage or adoption and sharing the same dwelling. The SHIW dataset has a panel component: in each wave, part of the sample has consisted of households that were interviewed in previous surveys (approximately 4000 households). For the purpose of our analysis, we restrict our sample to individuals who are either the head of household or spouses who are aged between 26 and 35 years, as we want to exclude individual still in education and rule out dynamics of the labor market that less likely to be affected by liquidity constraints. In addition, our empirical strategy requires respondents to be observed at least three times at different points in time. To analyze the impact of liquidity constraints on the intensive margin of labor supply, we focus on the sample of working respondents. The total number of female workers is 394 (768 if we include women out of the labor market) while male respondents number 409.

The SHIW dataset collects detailed information on household composition, labor supply, income and wealth. It gathers detailed information on the labor market status of those interviewed, including the number of weeks and average weekly working hours he/she worked in the previous year.

To investigate the potential effect of credit rationing, we exploit information allowing us to detect liquidity constrained individuals. For this purpose we use an indicator, drawn from the approach by Jappelli et al. (1998), that defines liquidity constrained households as those who either: a) applied to a bank or a financial company to ask for a loan or a mortgage and the application was rejected; or b) answer positively to the following question "In [year] did you or any other member of your household consider the possibility of applying to a bank or a financial company for a loan or a mortgage but then change your mind thinking that the application would be rejected?"

Descriptive statistics of the sample are reported in Table 1. The average respondent is roughly 32 years old and earns approximately nine euros per hour.[2] The 84% of female respondents are married and have a working partner, while less than 80% of men are married and 46% of them have a working wife. The income of partners[3] is roughly 17 thousand euros if we look at female respondents and 6 thousand for the sample of men. Looking at the household composition, less than 5% of the sample has 3 children or more. The percentage of respondents with one or two children is about 20% for both groups, while the share of respondents without children is much higher (almost 50%). The main outcome variable, the intensity of labor supply, is substantially higher for male workers: they work, on average, almost ten hours per week more than their female counterpart. The bottom panel of the table shows that, 63% of women participate to the labor market, namely work or report to be unemployed (57% of the sample supply a positive number of working hours). Turning to our variables of interest, the liquidity constraints variable, men and women are likely to suffer from restrictions in the credit market are, respectively 7% and 5%.In order to control for heterogeneity in the economic framework, we also include in the econometric analysis the regional unemployment rate of people older than 25 and year dummy variables.

Heterogeneity between constrained and unconstrained respondents is summarized in Table 2. Constrained individuals tend to be younger and to earn a lower hourly wage with respect to their unconstrained counterpart, albeit the difference is not statistically significant at the 10% level. Women who are married and have no children are significantly less likely to be constrained, while differences in household composition between constrained and unconstrained men are sensibly smaller. Even if not statistically significant, the association between binding constraints and income of the spouse has an opposite sign according to gender. Husband labor income, that is possibly the main breadwinner, reduces the probability that a female is constrained. Contrarily, constrained men can rely on a slightly higher wife's labor income. Finally, there is a negative association between the regional unemployment rate and binding constraint for women, possibly driven by broader regional time invariant factors (the unemployment rate may be correlated with credit market conditions, the availability of childcare services, to price levels, etc.).[4]

[2]The hourly wage is computed dividing labor income by the number of working hours.

[3]The average income refers to the whole sample, thus including also partners with no earnings and single respondents.

[4]It is worth noting that the results we present in the following sections are robust to the inclusion of individual fixed effect (regional fixed effect are embedded in it) and to its

Turning to the outcome variables, constrained women work, on average, 3.5 hours more than their unconstrained counterpart, that is consistent with the response of labor supply to liquidity constraints. In the same direction, constrained women are significantly more likely to be in the labor force with respect to the unconstrained ones (the share of women in the labor market is, respectively, 62% and 82%). The reverse is observed for men: liquidity constraints are associated to a reduction in the intensity of male labor supply by more than 4 hours per week. This evidence is likely to capture the impact of male labor income on the probability that liquidity constraints bind, and points out the potential relevance of endogeneity, driven by reverse causality, in the estimate of the causal effect of credit constraints on labor supply.

Figures 1 and 2 plots the distribution of the intensity of labor supply of, respectively, women and men, distinguishing between constrained and unconstrained workers. The plot of working hours supplied by women (Figure 1) has two peaks: the highest one is around 40 per week (full-time) and the other one is in correspondence of part-time schedule (20 hours). In addition we observe, for constrained workers only, a concentration around 50 hours per week. Below the full-time schedule, the density function for the constrained sample lies behind the density for unconstrained one. On the opposite, the share of women who supply 40 and 50 hours per week is substantially greater when liquidity constraints are binding. The evidence in this graph is, thus, consistent with a positive association between intensity of female labor supply and binding liquidity constraints. Figure 2 points out a different path for male workers. The density of working hours supplied by unconstrained men is more skewed on the right, with a high concentration in correspondence of full-time.

4 Empirical strategy

This paper aims to analyze the effect that liquidity constraints have on labor supply. We examine the intensive margin, namely the number of working hours for working respondents, and participation to the labor market.

We first start by estimating the number of hours supplied by workers (i.e., on the subsample of those who participate to the labor market). Previous literature has shown persistence to be an important aspect of the labor supply decisions of married women (Del Boca and Sauer, 2009; Francesconi, 2002). Thus, we assume them to exhibit state dependence: The number

correlation to the covariates.

of working hours depends on last period's ones, even after controlling for covariates. CITARE QUI BENITO E SALEHEEN?

The estimating equation is:

$$H_{it} = \rho H_{t-1} + Z'_{it}\gamma + \delta LC_{it} + c_i + u_{it} \tag{1}$$

where H_{it} is the number of working hours supplied by individual i in period t and Z_{it} is a matrix of covariates. The error term consists of the individual unobserved heterogeneity (c_i) and an idiosyncratic component (u_{it}); ρ, γ and δ are the coefficients to be estimated. In this setting LC_{it} is considered to be an exogenous variable, equal to one when the household is constrained in the credit market. We also control for working hours of previous period as a determinant of current working hours to allow for persistence. However, introducing the lagged dependent variable would generate a bias in the coefficient if fixed effect were used. In order to address this issue we use the GMM procedure proposed by Arellano and Bond (1991) to estimate equation 1 under the assumption of absence of correlation between the two error terms. Even if this method does not require any assumption on the correlation between individual unobserved heterogeneity and the covariates (and, in particular, the indicator for liquidity constraints), LC_{it} may be endogenous in the estimating equation because of idiosyncratic shocks, that may affect both the error term u_{it} and LC_{it}. Moreover, the estimate of the equation above is biased if being liquidity constrained were associated with lower amount of working hours (if individuals are working less, they are less likely to obtain credit from the bank), this channel pushing downwards the coefficient δ.

We also explore whether liquidity constraints affect the extensive margin, namely the likelihood of working a positive number of hours. We estimate the following equation:

$$W_{it} = \rho W_{t-1} + Z'_{it}\gamma + \delta LC_{it} + c_i + u_{it} \tag{2}$$

where W_{it} is equal to one if the respondent works and zero otherwise. Similarly to the intensive margin, we start by estimating our model using a random effect estimator and we address the endogeneity issue by using the Arellano and Bond (1991) GMM procedure and allowing for the endogeneity of the liquidity constrained variable, LC_{it}.

Previous empirical literature has shown the female labor force participation to be more volatile and more sensitive to household debt (Del Boca and Lusardi, 2003), while men's labor supply is, indeed, rather rigid. Thus, to allow the effect of the explaining factors to differ according to gender, both the equations above for women and men are estimated also separately.[5]

5 Results

We start our analysis by focusing on the intensity of the labor supply by splitting our sample between female and male respondent.[6] Table 3 shows the random effect estimate of working hours (equation 1) for women and men, respectively, in columns 1-3 and 4-6. The first specification includes, along with the hours of work supplied in the previous wave and our measure for liquidity constraints, a matrix of individual covariates (second order polynomial for age and hourly wage; marital status and schooling). In the second and third specifications we add to these variables a vector of family covariates (working status and income of the partner, number of children) and macroeconomic variables (regional unemployment rate and year dummies, that proxies for the business cycle). In all the specifications, we observe a significant state dependence and an association of the intensity of labor supply with schooling (positive) and hourly wage (decreasing and concave), for both women and men. However, we fail to detect a significant association of the outcome variable with our measure of credit constraints.

As discussed in previous section, random effect estimates may be biased if the strict exogeneity assumption is violated. This may occur because of state dependence of the dependent variable and because of potential correlation of some of the covariates, possibly liquidity constraints, with the unobserved heterogeneity (Wooldridge, 2001). In addition, idiosyncratic shocks may affect both the intensity of labor supply and access to the credit market. To address these issues, we estimate equation 1 using the Arellano and Bond (1991) GMM procedure in Tables A-2, 4 and 5 for, respectively, the whole sample, women and men. In each table, columns 1-3 report the results when assuming liquidity constraints to be exogenous, while in columns 4-6 it is allowed to be endogenous. Estimate results in Table A-2 shows that the intensity of labor supply is persistent over time and the main determinants of labor supply relates to the family composition (having a working partner and the number of children) and to the hourly wage. However, we fail to detect a significant effect of liquidity constraints on the number of working

[5] The participation model has been estimated only on the women's sample, since all men currently work or are unemployed.

[6] The same set of estimates on the whole sample are reported in Table A-1 in Appendix B. Men work, on average, six hours more than women; the main insights of Table 3 are confirmed.

hours. To investigate whether the access to credit impact differently on male and female labor supply, we analyze the two samples separately.

Tables 4 and 5 report the estimate results for, respectively, women and men. The intensity of male labor supply displays a significant state dependence: Men who worked ten more hours in the previous wave (2 years before) work, on average, 2.5-3 more hours in the year of the interview. The coefficient for state dependence is, indeed, lower and not significant for female labor supply. This finding is consistent with the results showing female labor supply to be less persistent over time than male labour supply (Del Boca and Lusardi, 2003). Turning to our main variable of interest, liquidity constraints, our findings show that, its impact on the intensity of labor supply differs substantially across gender. Looking at our results, liquidity constraints appear to act as an enhancing factor promoting the choice to work additional hours for female respondents. Results in the first three columns of Table 4 show that, under the assumption of exogenous liquidity constraints, constrained women work, on average, 5 more hours with respect to the unconstrained ones. This effect is significantly different from zero at the 1% level and corresponds to an increase in hours supplied by women by almost 15% (the average number of working hours in the sample is 34).[7] We acknowledge that these estimates are biased downward if idiosyncratic shocks negatively affect both the labor supply and the access to credit. We thus allow for the endogenity in (columns 4-6). The effect of credit constraints on female working hours is now between 6 and 8 hours (18-24% of the average). The estimated coefficients in columns 4-6 are, however, less precise, partly because of the increase in the number of the instruments. Conversely, we do not find any significant effect (the only exception is column 1) of liquidity constraints on male labor supply (Table 5), possibly because the large part of Italian men is employed as full time workers (in our sample, men work, on average, 43 hours), showing that the work supply by men is inelastic. Even if not significant, the impact of liquidity constraints on male labor supply is negative when we do not control for possible correlation of our measure for credit constraints with idiosyncratic shocks (columns 1-3) and becomes positive or very close to zero when we address this endogeneity issue. This change in the sign of the estimated coefficient, is consistent with the relevance of idiosyncratic unobserved shocks in driving both male labor supply and access to credit.

Turining to other regressors, we can still highlight a different impact of almost each regressor on women and men. Older women work, on average,

[7]This finding also points out the relevance of the bias in the random effect estimate.

less hours with respect to young ones, while men's labor supply does not significantly varies with age. Workers in the sample shape the intensive margin of their labor supply according to their wage. The income effect is larger than the substitution effect for both women and men, but the overall impact of wage on working hours is larger (and significant at 1%) for women. An increase in the hourly wage by one euro (that is roughly 11% of the average wage) approximately reduces the number of working hours supplied by women and men by, respectively, 1.3 (4% of the sample mean) and 0.7 (1.7% of the sample mean). Also family composition is a relevant determinant of male labor supply. On one hand, married men work, on average 11-12 hours per week more than singles do, and fathers with two or more children supply 7-9 hours less then men without children. On the other hand, the intensity of female labor supply is neither significantly affected by marital status nor by the number of children.

Tests for the absence of (second order) autocorrelation in first-differenced errors (Arellano and Bond, 1991) are reported in the last row of the tables. The test does not allow to reject the null hypothesis of zero correlation: the P-value is always greater than 0.20 for the female sample and above 0.28 for men.

In order to check the sensitivity of our results to arbitrary age restrictions we perform addiitonal robustness checks. We estimate equation 1 by including, alternatively, younger and older respondents. Table 6 shows the coefficient of our main variable of interest, liquidity constraints, for the six specifications in tables 4 and 5. Estimation results for women and men are reported, respectively, in the upper and lower panel. The first row in each panel recalls the estimated coefficients for our baseline specification, i.e. the average effect for respondents aged 26-35. The second row reports estimation results when including in the sample also individuals aged between 21 and 25. The effect of our main variable of interest on the intensity of the labor supply female workers larger and more precisely estimated. When controlling for the endogeneity of credit access, constrained women work, on average, between 9 and 11 hours per week more than the unconstrained ones. Conversely, when we consider respondents aged 26-40 (third row), the effect of liquidity constraints is smaller and not significant in columns 4-6. All in all, these findings are consistent with the idea that credit constraints foster the intensity of female labor supply and that this channel is more notable in early stages of the life cycle, when borrowing restrictions are more likely to bind. When changing the sample age composition we do not find evidence of a significant effect of liquidity constraints on the intensity of labor supply of men when controlling for the correlation of credit access to idiosyncratic shocks. There is indeed evidence of a negative correlation when we do not address its endogeneity in the older sample. This evidence suggest that, for men in a later stage of their life cycle, liquidity constraints are more likely to be driven by an unobserved shocks.

We continue our analysis by focusing on the dichotomous variable of working status, as shown in Table A-6 (o A-5?). As the entire sample of male respondents either work or are looking for a job, we focus on variations in female participation. Similarly to previous tables, we add to individual covariates (column 1) family variables (column 2) and macroeconomic variables (column 3). The same specifications are estimated addressing the endogeneity of liquidity constraints in columns 4-6. Looking at our main variable of interest, we fail to detect any significant effect of liquidity constraints on the contemporaneous choice of working. Labor supply may, however, adjust more slowly in its extensive margin with respect to the intensive one. To check whether this is the case, we estimate equation 2 using, as a measure for LC, a dummy that capture whether the respondents was liquidity constrained in the previous wave. Results are shown in Table 7. First, we notice that, after controlling for being liquidity constrained in the previous wave, the estimated coefficient for the ρ parameter in equation 2 becomes statistically significant: the volatility of female participation over time is partly related to the existence of credit constraints. Results in columns 1-3 show that the probability of working is 16 percentage points higher for constrained women (that is 28% of the participation rate in our sample). As expected, the magnitude of the coefficient increases when we address the endogeneity of our measure of liquidity constraints, but the standard error more than doubles and estimated coefficients in columns 5-6 are not statistically significant.

6 Conclusions

This paper adds to the literature by adding a bridge between the financial and the labour rmarket. We explore whether labor supply decisions might be driven by inefficiencies in the financial markets such as restriction to credit. Financial markets and labor markets are strongly related, and reforms affecting one market are likely to also have an impact on the other one. Using a conceptual framework of the life cycle model enriched with the possibility of choosing the labor supply in the working phase of life, we argue that the presence of more binding liquidity constraints are likely to increase the labor supply. This is because one way to overcome credit frictions is to work more hours so as to earn additional income, necessary to accomplish consumption smoothing. In our paper we test this hypothesis by using the SHIW dataset provided by the Bank of Italy. Our findings suggest that, after controlling for the correlation of unobserved heterogeneity with the regressors, the persistence in labor supply and the endogeneity of being liquidity constrained, this channel is certainly at work for female labor supply. Credit market restrictions are responsible for additional hours worked by women (on average, 8 hours per week), but not by men. In addition, constrained women are more likely to work, two years after liquidity constraints has been detected, by 16-22 percentage points.

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Tables

Table 1: Summary statistics

	Women		Men	
Working hours	33.671	11.128	43.153	11.816
Constrained	0.071	0.257	0.054	0.226
Age	32.175	2.025	32.269	1.928
Age sq.	1039.327	129.253	1044.993	123.159
Wage	8.754	5.614	8.716	4.790
Wage sq.	108.070	296.620	98.865	247.042
Married	0.840	0.367	0.792	0.406
Working partner	0.838	0.369	0.462	0.499
Income partner	16.965	10.439	6.161	7.736
1 Child	0.226	0.419	0.183	0.387
2+ Children	0.239	0.427	0.259	0.36
Regional unempl. rate	5.910	3.625	7.689	4.804
Year 2004	0.185	0.389	0.159	0.366
Year 2006	0.178	0.383	0.169	0.375
Year 2008	0.206	0.405	0.191	0.393
Year 2010	0.119	0.325	0.112	0.316
Observations	394		409	
	Restricted sample			
Constrained	0.082	0.275	0.047	0.213
Observations	219		232	
	Including respondents out of the labor market			
Participation	0.628	0.484		
Participation (working)	0.570	0.495		
Constrained	0.051	0.220		
Observations	768			

Table 2: Summary statistics by gender and *Constrained*

	Women		Men	
	Unconstrained	Constrained	Unconstrained	Constrained
Working hours	33.415	37.024*	43.382	39.114*
	(11.205)	(9.632)	(11.763)	(12.302)
Age	32.221	31.571	32.282	32.045
	(2.012)	(2.133)	(1.937)	(1.786)
Wage	8.798	8.174	8.765	7.851
	(5.790)	(2.264)	(4.842)	(3.763)
Married	0.858	0.607*	0.791	0.818
	(0.350)	(0.497)	(0.407)	(0.395)
Working partner	0.852	0.643*	0.463	0.455
	(0.355)	(0.488)	(0.499)	(0.510)
Income partner	17.191	14.003	6.141	6.504
	(10.161)	(13.438)	(7.722)	(8.168)
0 Children	0.516	0.786*	0.553	0.636
	(0.026)	(0.079)	(0.025)	(0.105)
1 Child	0.235	0.107	0.183	0.182
	(0.425)	(0.315)	(0.388)	(0.395)
2+ Children	0.249	0.107	0.264	0.182
	(0.433)	(0.315)	(0.441)	(0.395)
Regional unempl. Rate	6.013	4.575*	7.729	6.974
	(3.729)	(1.150)	(4.850)	(3.926)
Participation	0.618	0.821*		
	(0.486)	(0.389)		
Working	0.562	0.718*		
	(0.496)	(456)		

Notes: * indicates that the difference in the mean of the variable between constrained and unconstrained respondents is statistically different from zero at 10%.

Table 3: Random effect estimate of the intensive margin, by gender

	Women			Men		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours ($t-1$)	0.219***	0.209***	0.198***	0.296***	0.290***	0.285***
	(0.049)	(0.051)	(0.047)	(0.046)	(0.047)	(0.045)
Constrained	1.488	1.320	0.665	-1.453	-1.422	-1.032
	(1.197)	(1.201)	(1.234)	(1.936)	(1.934)	(1.786)
Age	-6.856	-6.256	-6.554	-3.716	-2.965	-2.857
	(5.181)	(5.065)	(5.228)	(9.100)	(8.958)	(8.960)
Age sq.	0.104	0.094	0.100	0.058	0.046	0.046
	(0.081)	(0.079)	(0.082)	(0.140)	(0.138)	(0.139)
Wage	-0.701***	-0.702***	-0.773***	-1.302***	-1.366***	-1.399***
	(0.066)	(0.071)	(0.088)	(0.207)	(0.210)	(0.211)
Wage sq.	0.001***	0.001***	0.002***	0.012***	0.012***	0.013***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)
Married	-5.758***	-2.380	-2.365	-0.069	-1.411	-1.392
	(1.309)	(2.404)	(2.325)	(1.102)	(1.315)	(1.377)
Years education	0.286**	0.242*	0.274*	0.263**	0.253*	0.303**
	(0.129)	(0.139)	(0.147)	(0.134)	(0.133)	(0.134)
Working partner		-4.470*	-3.485		-1.444	-1.473
		(2.539)	(2.337)		(1.567)	(1.681)
Income partner		0.040	0.020		0.151	0.144
		(0.063)	(0.063)		(0.094)	(0.099)
1 Child		-0.738	-1.529		2.290*	0.602
		(1.264)	(1.630)		(1.247)	(1.356)
2+ Children		-1.101	-2.219		1.865	-0.131
		(1.269)	(1.670)		(1.203)	(1.268)
Regional unempl. rate			0.206			0.328
			(0.424)			(0.338)
Year dummies	No	No	Yes	No	No	Yes
Obs.	602	602	602	706	706	706

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported; estimates also include a constant term. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table 4: Arellano and Bond estimate of the intensive margin: women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours $(t-1)$	0.225*	0.208	0.171	0.199	0.186	0.143
	(0.132)	(0.133)	(0.120)	(0.127)	(0.126)	(0.112)
Constrained 1	5.033***	4.925***	5.003***	6.986	6.226	8.087*
	(1.711)	(1.627)	(1.569)	(4.386)	(4.505)	(4.720)
Age	-15.983**	-14.246*	-14.968*	-15.927**	-13.963*	-14.907*
	(7.965)	(7.549)	(7.928)	(7.887)	(7.422)	(7.955)
Age sq.	0.240*	0.211*	0.218*	0.239*	0.206*	0.217*
	(0.123)	(0.117)	(0.118)	(0.122)	(0.115)	(0.118)
Wage	-1.229***	-1.301**	-1.285***	-1.234***	-1.284***	-1.296***
	(0.459)	(0.512)	(0.497)	(0.450)	(0.498)	(0.494)
Wage sq.	0.008	0.010	0.010	0.008	0.010	0.010
	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Married	-21.048	-19.864	-19.564	-20.708	-19.268	-18.602
	(15.245)	(12.762)	(13.482)	(15.109)	(12.549)	(13.257)
Working partner		-2.624	-2.459		-3.021	-3.112
		(8.302)	(7.899)		(8.389)	(7.871)
Income partner		0.025	0.040		0.022	0.029
		(0.156)	(0.155)		(0.150)	(0.149)
1 Child		-3.359	-3.123		-3.197	-3.015
		(3.470)	(3.739)		(3.441)	(3.675)
2+ Children		-3.151	-3.119		-3.020	-3.086
		(2.187)	(2.997)		(2.160)	(2.998)
Regional unempl. rate			-0.457			-0.482
			(0.714)			(0.712)
Year dummies	No	No	Yes	No	No	Yes
Obs.	219	219	219	219	219	219
No autocorrelation test	1.270	1.183	1.109	1.261	1.171	1.079
P-value	0.204	0.237	0.267	0.207	0.242	0.281

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table 5: Arellano and Bond estimate of the intensive margin: men

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours ($t-1$)	0.267***	0.334***	0.267***	0.243***	0.299***	0.243***
	(0.098)	(0.115)	(0.091)	(0.086)	(0.102)	(0.083)
Constrained 1	-3.842**	-2.562	-1.771	1.205	-0.647	5.083
	(1.672)	(1.973)	(1.949)	(6.838)	(6.164)	(6.736)
Age	-5.966	-6.230	-9.496	-5.811	-6.284	-10.386
	(14.559)	(14.359)	(15.298)	(14.520)	(14.388)	(15.827)
Age sq.	0.087	0.092	0.141	0.085	0.093	0.155
	(0.223)	(0.221)	(0.238)	(0.222)	(0.221)	(0.247)
Wage	-0.707*	-0.598	-0.683*	-0.719*	-0.585	-0.709*
	(0.404)	(0.398)	(0.397)	(0.426)	(0.402)	(0.422)
Wage sq.	-0.006	-0.009	-0.007	-0.006	-0.008	-0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Married	12.437**	11.027*	10.943*	12.290*	10.697*	10.020
	(6.323)	(6.278)	(6.464)	(6.289)	(6.348)	(6.761)
Working partner		3.661	4.473		4.026	6.090*
		(2.710)	(2.871)		(3.144)	(3.571)
Income partner		-0.155	-0.213		-0.180	-0.290
		(0.201)	(0.203)		(0.206)	(0.224)
1 Child		0.260	-1.229		0.310	-1.160
		(2.728)	(3.324)		(2.702)	(3.260)
2+ Children		-6.731*	-8.468**		-6.518*	-8.685**
		(3.613)	(3.495)		(3.476)	(3.567)
Regional unempl. rate			-0.484			-0.286
			(0.698)			(0.652)
Year dummies	No	No	Yes	No	No	Yes
Obs.	232	232	232	232	232	232
No autocorrelation test	-0.936	-0.939	-1.053	-0.961	-0.928	-1.075
P-value	0.349	0.348	0.292	0.336	0.353	0.282

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is the observed wage for working hours and mean wage observed in the region where the respondent lives, considering individuals with the same gender and educational level for participation.

Table 6: Sensitivity analysis: different age bands

	Women					
	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
	Age 26-35 (baseline)					
Constrained	5.033***	4.925***	5.003***	6.986	6.226	8.087*
	(1.711)	(1.627)	(1.569)	(4.386)	(4.505)	(4.720)
Obs.	219	219	219	219	219	219
	Age 21-35					
Constrained	4.569***	4.516***	4.753***	9.916**	9.040**	10.496**
	(1.644)	(1.544)	(1.530)	(4.949)	(3.993)	(4.516)
Obs.	247	247	247	247	247	247
	Age 26-40					
Constrained	2.502**	2.535**	2.341*	1.669	2.062	0.160
	(1.264)	(1.268)	(1.247)	(5.147)	(5.145)	(5.296)
Obs.	634	634	634	634	634	634
	Men					
	LC exogenous			LC endogenous		
	Age 26-35 (baseline)					
Constrained	-3.842**	-2.562	-1.771	1.205	-0.647	5.083
	(1.672)	(1.973)	(1.949)	(6.838)	(6.164)	(6.736)
Obs.	232	232	232	232	232	232
	Age 21-35					
Constrained	-2.638*	-1.787	-1.174	-0.935	-3.519	-5.339
	(1.427)	(1.634)	(1.752)	(4.568)	(4.110)	(5.554)
Obs.	258	258	258	258	258	258
	Age 26-40					
Constrained	-3.523*	-3.553*	-3.888*	7.146	10.739	3.135
	(2.107)	(2.066)	(2.111)	(9.731)	(10.929)	(9.627)
Obs.	810	810	810	810	810	810

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported; standard errors (in brackets) are robust to heteroskedasticity. Covariates in Table ?? are also included.

Table 7: Arellano and Bond estimate of the intensive margin (lagged value of LC): women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Participation (t-1)	0.365**	0.353**	0.310*	0.362**	0.350**	0.304*
	(0.155)	(0.155)	(0.182)	(0.155)	(0.154)	(0.179)
Constrained (t-1)	0.158**	0.165**	0.159**	0.224	0.217	0.192
	(0.065)	(0.064)	(0.065)	(0.158)	(0.151)	(0.146)
Age	0.259*	0.229	0.220	0.259*	0.227	0.218
	(0.153)	(0.152)	(0.155)	(0.153)	(0.152)	(0.154)
Age sq.	-0.004*	-0.004	-0.004	-0.004*	-0.004	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Mean wage	0.013	0.014	0.014	0.013	0.014	0.013
	(0.013)	(0.014)	(0.014)	(0.013)	(0.014)	(0.014)
Mean wage sq.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.052	-0.071	-0.067	-0.052	-0.071	-0.064
	(0.213)	(0.214)	(0.215)	(0.212)	(0.213)	(0.214)
Working partner		0.087	0.087		0.087	0.086
		(0.075)	(0.073)		(0.075)	(0.073)
Income partner		-0.002	-0.002		-0.002	-0.002
		(0.001)	(0.001)		(0.001)	(0.001)
1 Child		-0.031	-0.035		-0.033	-0.040
		(0.063)	(0.069)		(0.062)	(0.069)
2+ Children		0.052	0.049		0.055	0.046
		(0.041)	(0.066)		(0.043)	(0.065)
Regional unempl. rate			-0.005			-0.005
			(0.014)			(0.014)
Year dummies	No	No	Yes	No	No	Yes
Obs.	457	457	457	457	457	457
No autocorrelation test	-1.121	-2.022	-0.253	-1.218	-0.133	-0.306
P-value	0.262	0.875	0.800	0.223	0.895	0.760

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives, considering individuals with the same gender and educational level for participation.

Figures

Figure 1: Working hours of constrained and unconstrained women

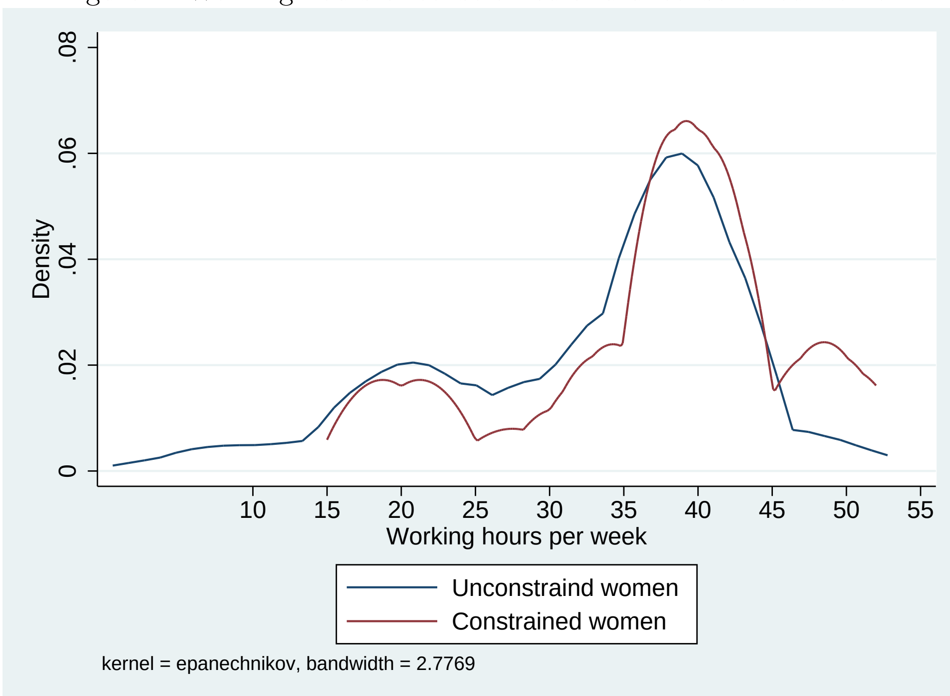

Figure 2: Working hours of constrained and unconstrained men

A The model

Setup of the model:

- two periods;
- in each period individuals choose the level of consumption c_t, $t = 1, 2$;
- in $t = 1$ individuals set their labor supply, i.e. they choose the share of time ($l_1 \in (0, 1)$) to spend for leisure;
- in $t = 2$ individuals retire ($l_2 = L$);
- wealth (A_t) is timed at the beginning of the period while consumption (c_t) and leisure (l_t) are set at the end of each period.
- initial wealth is exogenous and equal to zero and agents die with zero wealth
- For simplicity interest rate and subjective discount rate are set to zero

Individuals maximize the utility function

$$U = \sum_{t=1}^{2} u(c_t, l_t) = u(c_1, l_1) + u(c_2, L)$$

subject to the budget constraint

$$A_2 = w(1 - l_1) - c_1$$

$$c_2 = Y_r + A_2$$

where w is the wage rate and Y_r is pension, irrespectively on contribution paid. The last condition holds strictly since there is not a bequest motive. The maximization problem can be written as:

$$\max_{A_2, l_1} U = u[w(1 - l_1) - A_2, l_1] + u[A_2 + Y_r, L].$$

Two additional constraints must hold. The participation constraint:

$$(1 - l_1) \geq 0$$

and the liquidity constraint, according to which wealth cannot be less than an exogenous threshold B (non necessarily zero):

$$A_2 \geq B.$$

The Lagrangian multiplier is therefore:

$$L = u[w(1-l_1) - A_2, l_1] + u[A_2 + Y_r, L] + \lambda[A_2 - B] + \gamma[1 - l_1]$$

The Kuhn-Tucker conditions are:

$$\frac{\partial L}{\partial A_2} = u'_{c_1}(c,l) - u'_{c_2}(c,l) + \lambda = 0$$

$$\frac{\partial L}{\partial l_1} = -wu'_{c_1}(c,l) + u'_{l_1}(c,l) - \gamma = 0$$

$$\lambda[A_2 - B] = 0$$

$$\gamma[1 - l_1] = 0$$

where u'_x is the marginal utility with respect of x. The second condition implies, as consequence of the liquidity constraint, that all wealth and income is consumed when the constraint is binding $c_2 = A_3$.

Supposing now a positive labor supply (γ equal to zero) we want to focus on the effect of liquidity constraints on the labor supply.

Let $u^{NC}_{.}$ the marginal utility in the unconstrained case (with λ equal to zero) we have that the first order conditions with respect to consumption and leisure imply, respectively:

$$u^{NC}_{c_1} = u^{NC}_{c_2}$$

$$u^{NC}_{c_1} = \frac{u^{NC}_{l_1}(c_1,l)}{w}$$

Suppose that the threshold B increases and liquidity constraints start binding. The Kuhn-Tucker conditions imply that (we denote with the upscript C the constrained case):

$$u^{C}_{c_1}(c_1,l) > u^{C}_{c_2}(c_2,L)$$

$$u^{C}_{c_1}(w(1-l)+B,l) = \frac{u^{C}_{l_1}(w(1-l)+B,l)}{w} > u^{C}_{c_2}(c_2,L)$$

In this case, $u^C_{c_1} > u^C_{c2}$ given that λ is positive, requiring that $u^C_{l_1}$ be smaller than without liquidity constraints $u^{NC}_{l_1}$. From the last inequality we derive that c_2 is higher than without capital imperfection (where the inequality holds as an equality) as consumers cannot borrow money and thus they have to consume the income increase after the realisation. Consumption at time one will be necessary lower than without liquidity constraints (a higher consumption at time one would imply additional labor supply as borrowing is restricted implying a lower, instead of a higher, marginal utility of consumption in period one than in period two). The only way to keep marginal utility of consumption equal to that of leisure is thus to increase labor supply by reducing leisure.

If liquidity constraints bind labor supply increases as it acts as a channel to partially smooth marginal utility of consumption across times.

B Additional Tables

Table A-1: Random effect estimate for the intensive margin (men and women)

Working hours $(t-1)$	0.278***	0.277***	0.271***
	(0.033)	(0.034)	(0.033)
Constrained	0.244	0.226	0.148
	(1.136)	(1.149)	(1.156)
Male	6.441***	5.975***	5.612***
	(0.656)	(0.672)	(0.659)
Age	-7.109	-6.880	-7.009
	(5.706)	(5.559)	(5.675)
Age sq.	0.110	0.107	0.110
	(0.088)	(0.086)	(0.088)
Wage	-0.679***	-0.678***	-0.717***
	(0.111)	(0.113)	(0.121)
Wage sq.	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
Married	-2.232***	-1.629	-1.613
	(0.839)	(1.106)	(1.129)
Years education	0.202**	0.230**	0.260**
	(0.099)	(0.101)	(0.103)
Working partner		-1.207	-0.811
		(1.115)	(1.182)
Income partner		-0.006	-0.022
		(0.054)	(0.054)
1 Child		0.911	-0.327
		(0.871)	(1.009)
2+ Children		0.273	-1.227
		(0.845)	(1.016)
Regional unempl. rate			0.379
			(0.267)
Year dummies	No	No	Yes
Obs.	1308	1308	1308

Notes: $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$. Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

Table A-2: Arellano and Bond estimate of the intensive margin: men and women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours $(t-1)$	0.244**	0.281***	0.269**	0.209**	0.261**	0.240**
	(0.097)	(0.108)	(0.106)	(0.097)	(0.107)	(0.108)
Constrained	1.378	1.799	2.052	8.185	2.657	6.799
	(1.382)	(1.400)	(1.395)	(8.113)	(7.745)	(7.574)
Age	-11.207	-10.405	-11.443	-11.310	-10.181	-11.633
	(8.370)	(8.100)	(8.386)	(8.370)	(8.042)	(8.341)
Age sq.	0.168	0.155	0.165	0.170	0.151	0.168
	(0.129)	(0.125)	(0.127)	(0.129)	(0.124)	(0.127)
Wage	-0.899**	-0.855**	-0.903**	-0.941**	-0.847**	-0.927**
	(0.363)	(0.368)	(0.375)	(0.375)	(0.367)	(0.382)
Wage sq.	0.001	0.001	0.001	0.002	0.001	0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Married	-3.300	-4.827	-4.257	-3.249	-4.743	-4.289
	(9.458)	(8.979)	(9.365)	(9.318)	(8.997)	(9.344)
Working partner		3.918*	3.902*		4.018*	4.600*
		(2.123)	(2.266)		(2.330)	(2.406)
Income partner		-0.103	-0.092		-0.110	-0.122
		(0.125)	(0.124)		(0.127)	(0.122)
1 Child		-1.036	-2.107		-1.020	-2.057
		(2.105)	(2.507)		(2.138)	(2.449)
2+ Children		-4.791**	-6.240**		-4.694**	-6.301**
		(2.127)	(2.653)		(2.090)	(2.605)
Regional unempl. rate			-0.838			-0.782
			(0.694)			(0.682)
Year dummies	No	No	Yes	No	No	Yes
Obs.	451	451	451	451	451	451
No autocorrelation test	-1.121	-2.022	-0.253	-1.218	-0.133	-0.306
P-value	0.262	0.875	0.800	0.223	0.895	0.760

Notes: $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table A-3: Arellano and Bond estimate of the intensive margin (lagged value of LC): women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours (t-1)	0.219*	0.203	0.172	0.256*	0.233*	0.177
	(0.129)	(0.132)	(0.119)	(0.140)	(0.138)	(0.117)
Constrained (t-1)	-3.903*	-4.227**	-4.531**	3.782	2.315	-2.680
	(1.993)	(1.994)	(2.007)	(4.247)	(3.406)	(4.165)
Age	-14.718*	-13.007*	-14.169*	-15.754*	-14.146*	-14.063*
	(7.853)	(7.394)	(7.824)	(8.521)	(7.969)	(7.799)
Age sq.	0.221*	0.192*	0.205*	0.236*	0.209*	0.204*
	(0.122)	(0.115)	(0.116)	(0.132)	(0.123)	(0.115)
Wage	-1.202***	-1.298**	-1.285***	-1.118**	-1.221**	-1.251***
	(0.453)	(0.505)	(0.494)	(0.455)	(0.501)	(0.485)
Wage sq.	0.008	0.010	0.010	0.006	0.009	0.009
	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)
Married	-20.960	-20.416	-20.759	-21.223	-20.779	-20.685
	(15.229)	(13.018)	(13.685)	(15.407)	(13.146)	(13.701)
Working partner		-1.604	-1.059		-2.044	-1.253
		(8.581)	(8.118)		(8.501)	(8.102)
Income partner		0.024	0.043		0.049	0.045
		(0.158)	(0.157)		(0.169)	(0.159)
1 Child		-3.726	-3.002		-3.384	-2.906
		(3.457)	(3.727)		(3.527)	(3.804)
2+ Children		-3.630	-2.994		-2.816	-2.717
		(2.210)	(2.983)		(2.197)	(2.967)
Regional unempl. rate			-0.464			-0.448
			(0.715)			(0.715)
Year dummies	No	No	Yes	No	No	Yes
Obs.	219	219	219	219	219	219
No autocorrelation test						
P-value		7				

Notes: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table A-4: Arellano and Bond estimate of the intensive margin (lagged value of LC): men

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Working hours (t-1)	0.255**	0.322***	0.265***	0.172	0.308***	0.262**
	(0.100)	(0.117)	(0.090)	(0.108)	(0.109)	(0.105)
Constrained (t-1)	-0.455	-3.246	-3.933	-37.104	-9.047	-57.593
	(1.965)	(2.622)	(2.541)	(35.650)	(24.051)	(52.437)
Age	-5.971	-6.141	-9.763	-3.084	-6.036	-9.791
	(14.583)	(14.235)	(15.287)	(15.235)	(13.718)	(17.703)
Age sq.	0.088	0.091	0.145	0.042	0.089	0.146
	(0.223)	(0.219)	(0.238)	(0.233)	(0.211)	(0.277)
Wage	-0.727*	-0.623	-0.709*	-1.081	-0.661	-1.081
	(0.412)	(0.403)	(0.400)	(0.695)	(0.460)	(0.767)
Wage sq.	-0.006	-0.008	-0.007	-0.001	-0.008	-0.004
	(0.005)	(0.006)	(0.005)	(0.009)	(0.006)	(0.009)
Married	12.430**	10.951*	11.094*	17.966**	11.388*	16.197
	(6.304)	(6.251)	(6.361)	(7.479)	(6.245)	(9.933)
Working partner		4.798*	5.632*		5.561	14.677
		(2.684)	(2.940)		(4.624)	(9.970)
Income partner		-0.201	-0.265		-0.235	-0.715
		(0.204)	(0.207)		(0.255)	(0.555)
1 Child		0.391	-1.292		0.515	-2.372
		(2.659)	(3.281)		(2.748)	(3.284)
2+ Children		-7.010*	-9.139**		-7.452	-16.734*
		(3.643)	(3.558)		(4.737)	(9.407)
Regional unempl. rate			-0.378			0.432
			(0.698)			(1.231)
Year dummies	No	No	Yes	No	No	Yes
Obs.	232	232	232	232	232	232
No autocorrelation test						
P-value						

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table A-5: Arellano and Bond estimate of the extensive margin (working): women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Participation $(t-1)$	0.125	0.119	0.016	0.097	0.090	-0.001
	(0.123)	(0.126)	(0.131)	(0.113)	(0.116)	(0.121)
Constrained 1	-0.098	-0.098	-0.092	-0.332	-0.350	-0.308
	(0.067)	(0.065)	(0.063)	(0.225)	(0.235)	(0.232)
Age	0.325**	0.306**	0.276**	0.349**	0.333**	0.300**
	(0.141)	(0.139)	(0.135)	(0.148)	(0.148)	(0.143)
Age sq.	-0.005**	-0.005**	-0.005**	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Mean wage	0.011	0.012	0.010	0.008	0.008	0.008
	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)
Mean wage sq.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.137	-0.152	-0.144	-0.137	-0.161	-0.154
	(0.122)	(0.132)	(0.134)	(0.122)	(0.133)	(0.133)
Working partner		0.064	0.058		0.072	0.064
		(0.071)	(0.068)		(0.071)	(0.068)
Income partner		-0.001	-0.001		-0.001	-0.001
		(0.001)	(0.001)		(0.001)	(0.001)
1 Child		-0.013	-0.039		-0.017	-0.035
		(0.064)	(0.073)		(0.063)	(0.073)
2+ Children		0.020	-0.009		0.016	-0.003
		(0.046)	(0.060)		(0.045)	(0.061)
Regional unempl. rate			-0.008			-0.008
			(0.013)			(0.012)
Year dummies	No	No	Yes	No	No	Yes
Obs.	457	457	457	457	457	457
No autocorrelation test						
P-value						

Notes: $^{*}p<0.1,^{**}p<0.05,^{***}p<0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.

Table A-6: Arellano and Bond estimate of the extensive margin (participating): women

	LC exogenous			LC endogenous		
	(1)	(2)	(3)	(4)	(5)	(6)
Participation $(t-1)$	0.332**	0.319**	0.274	0.279*	0.259*	0.212
	(0.152)	(0.152)	(0.177)	(0.150)	(0.147)	(0.164)
Constrained	-0.157**	-0.158**	-0.159**	-0.130	-0.144	-0.133
	(0.067)	(0.066)	(0.066)	(0.158)	(0.154)	(0.152)
Age	0.266*	0.238	0.226	0.263*	0.237	0.217
	(0.153)	(0.152)	(0.155)	(0.155)	(0.154)	(0.156)
Age sq.	-0.004*	-0.004	-0.004	-0.004*	-0.004	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Mean wage	0.013	0.014	0.013	0.012	0.013	0.013
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Mean wage sq.	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.049	-0.071	-0.069	-0.042	-0.064	-0.061
	(0.210)	(0.210)	(0.210)	(0.206)	(0.204)	(0.203)
Working partner		0.093	0.093		0.091	0.091
		(0.075)	(0.073)		(0.074)	(0.071)
Income partner		-0.002	-0.001		-0.001	-0.001
		(0.001)	(0.001)		(0.001)	(0.001)
1 Child		-0.039	-0.038		-0.039	-0.037
		(0.061)	(0.068)		(0.060)	(0.066)
2+ Children		0.035	0.039		0.033	0.038
		(0.040)	(0.066)		(0.039)	(0.062)
Regional unempl. rate			-0.006			-0.009
			(0.014)			(0.013)
Year dummies	No	No	Yes	No	No	Yes
Obs.	457	457	457	457	457	457
No autocorrelation test						
P-value						

Notes: $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Estimated coefficients are reported. Standard errors (in brackets) are robust to heteroskedasticity.

[a] Wage is observed wage for working hours and mean wage observed in the region where the respondent lives for individual with the same gender and educational level for participation.