Do Women Have Different Labor Supply Behaviors? Evidence Based on Educational Groups in Uruguay

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ABSTRACT

This study uses Uruguay's historical fluctuation in real wages to set up a natural experiment to measure the relation between women's labor supply and wages. Using data from the Continuous Household Surveys of the Uruguayan National Statistics Institute, for 1986–2010, it aims to identify and explain heterogeneity in the labor supply behavior of women with different educational backgrounds. It finds that all women groups seek to optimize their remunerated work allocation throughout their life cycle, although women's labor behaviors vary depending on educational levels. The rising trend of women's labor force participation is expected to continue; its implications at the intensive margin are ambiguous and depend on how women conciliate paid work with household responsibilities – especially women with less education. These results could inform present debates about designing public policies to facilitate women's entry into the labor market and cater to their different wage profiles and household care demands.

KEYWORDS

Labor force participation, labor supply, women and work

JEL Codes: C1, J22

INTRODUCTION

Growing numbers of women entering paid work is among the greatest social transformations in western economies in recent decades (Blau and Kahn 2005; Goldin 2006). The increase in women's labor force participation and hours worked is commonly attributed to rising wages for women and the dominance of the substitution effect in their decisions. However, in the empirical literature there is no consensus about how elastic women's labor supply is, nor any agreement about how important wage levels are in explaining the recent changes in women's labor market behavior.

Marina Bassi (2003) argues that the elasticity of women's labor supply is overestimated in studies in developed countries because the rising trend in women's labor supply coincides with long periods of rising wages. This time trend makes it difficult to isolate and measure the effect of wages on labor supply. The stochasticity of real wages subject to exchange rate fluctuations in developing countries and other economic shocks provides the basic conditions for a natural experiment. This is the case for Uruguay, where real wages have fluctuated considerably as a result of various macroeconomic shocks. Furthermore, Uruguay is also interesting because it has several economic, demographic, and sociocultural features that parallel more developed economies.

In this article, using pseudo panels of cross-sectional data of Uruguay, we estimate intertemporal and uncompensated wage women's elasticities by educational groups both at the extensive (labor participation) and intensive (weekly hours worked) margins. The analysis focuses on the differences between women with tertiary education and those without it. These elasticities enable us to quantify the magnitudes of the substitution and income effects in order to understand labor supply decisions.

A review of the literature on women's labor supply provides three main explanations about the magnitude of both elasticities. First, traditional household economics proposes low elasticity or inelastic response to wages for primary household earners. This is the case of the husband and could be the labor behavior of more educated women. Second, due to the high opportunity costs caused by their unpaid work in the household, women's labor behavior is modeled as secondary workers. The standard economic model predicts that the substitution effect should dominate in women's labor supply, expecting high elasticities (positive intertemporal and uncompensated). Finally, to the extent that women do unpaid work in the household, those who receive very low wages will have less incentive to allocate time to the labor market when their household's economic circumstances improves. If these workers also face liquidity constraints, their labor market participation will reflect the logic of additional workers in order to satisfy certain basic economic needs in the household (Dessing 2002). In this case, the added-worker effect means that the individual makes lifetime decisions based only on present well-being, so their intertemporal elasticity will be low. Unlike more educated women, these women will have relatively high uncompensated elasticities.[1] For these reasons, women with different educational levels cannot necessarily have the same labor supply behavior. The aim of this article is to explore this issue, which has received little attention in the literature.

Using the case of Uruguay, we confirm that there is a positive substitution effect; that is, when relative wage increases, women's labor force participation increases, and they work more hours – although in general, elasticities are more inelastic for women with higher educational

levels. Furthermore, we found that women adjust their labor supply in response to their life-cycle wages, namely, their labor supply decisions (participation in labor market and their time in paid work) respond to evolutionary wage changes along their life worker's wage profile. Our results refute the added-worker-effect model – commonly attributed to less educated women – because they show positive intertemporal elasticities at both the intensive and the extensive margins. Finally, we also find evidence of intergenerational shifts in the marginal utility of wealth, which may indicate long-term cultural changes for women.[2]

BACKGROUND

The empirical literature on women's work focuses on the relation between wages and female labor market supply.[3] These studies have primarily been conducted in developed countries. John Pencavel's (1998) important study analyzes women's labor supply in the United States at the extensive and the intensive margins and finds that younger cohorts have greater wage-supply elasticities, concluding that elasticities are greater among younger and married women.

Bassi (2003) proposes that these elasticities are overestimated because developed countries face no real wage deflation; she argues that the high elasticity in developed countries is explained by high collinearity between wages and women's labor force participation, and that consequently, wage responses cannot be distinguished from real shifts in women's labor decisions. Bassi uses Argentinean data to measure the relation between work and women's wages. The significant fluctuations in both variables that occur in response to macroeconomic shocks permit Bassi to isolate the pure wage effect. Using cohorts over the period 1975–2002, she estimates relatively lower wage elasticity in women's labor participation although she does not distinguish between uncompensated and intertemporal elasticities and does not analyze elasticities at the intensive margin.

Regarding studies that consider Uruguay, Roberto González and Héctor Sala (2011) analyze intertemporal elasticity in the Mercosur countries (1997–2009), but their analysis is not disaggregated by gender. They find elasticities are positive for Argentina but negative for Uruguay. They argue that the existence of severe liquidity constraints is the main reason for the latter results.

Alma Espino, Martín Leites, and Alina Machado (2009) and Alma Espino et al. (2014a) examine the elasticity of employees' labor supply with respect to wages in Uruguay. They find that women have a higher substitution effect when compared to men in the magnitudes of intertemporal and uncompensated elasticity.

Using the case of Uruguay, our research contributes to the branch of studies aimed at estimating intertemporal and uncompensated elasticities

among women. We also show the importance of the conceptual distinction between the two types of elasticities and the different ways that education and generation affect women's decisions on both extensive and intensive margins resulting in different work behaviors among women. Unlike most OECD countries, Uruguay has undergone several macroeconomic shocks, which generates considerable fluctuations in real income and wages and provides the opportunity for a natural experiment to estimate elasticities (Bértola and Lorenzo 2004). Furthermore, Uruguay has a number of economic, demographic, and sociocultural characteristics that allow comparisons with developed economies.

First, although Uruguay has a lower GDP per capita than most OECD countries, according to the World Bank, Uruguay's GDP level is higher than many upper middle-income countries.[4] Second, Uruguay's income inequality as reflected in the Gini Index (41), while higher than the average of European Union countries, is similar to other developed countries such as the US (41; World Bank 2016). In addition, Uruguay's early decline in fertility rates and high life expectancy at birth for women contribute to a demographic profile similar to OECD countries.[5] Furthermore, women's labor force participation rate and also the gender gap in participation rates are similar between Uruguay and the OECD countries.[6] In Uruguay, the labor market is predominantly urban; a good majority (72 percent) of workers is in paid employment in the private and public sectors. The level of formality in the workplace (around 70 percent) among women as well as men is high compared to the rest of the region and similar to developed countries (Instituto Nacional de Estadística [INE] 2010a).

Finally, unlike other Latin American countries, Uruguay is characterized by marked ethnic and racial homogeneity. This characteristic is explained by a low presence of indigenous cultures and a high share of European immigration since the early twentieth century, which have consolidated a homogeneous and Europeanized culture (Pellegrino 2010; INE 2014).

CONCEPTUAL FRAMEWORK

When it comes to devoting time to paid work, two decisions are involved. First, there is the choice of whether to enter the labor market (a decision on the extensive margin); and second, once the decision to participate has been made, the individual choice regarding the number of hours to work (a decision on the intensive margin). The relation between labor supply and wage rates is measured by elasticities and, depending on the specification employed, may incorporate the income effect, the substitution effect, or both of these effects (Blundell and MaCurdy 1999). At the extensive margin, this relation is positive because there is no income effect. The pure income effect assumes that when income rises, consumption opportunities rise too; if leisure is a normal good, leisure activities will increase, and

the number of hours devoted to work will fall. The substitution effect incorporates the change in relative prices when there is a pay rise: leisure becomes more expensive and its consumption falls as more hours are devoted to work. The labor supply response to changes in wages at the intensive margin is ambiguous and depends on which effect dominates. It will be positive if the substitution effect dominates and negative if the income effect is dominant.

We estimate elasticities with a life-cycle perspective on work and consumption decisions. We assume that individuals' labor supply decisions are connected over time, and therefore we consider the possibility that the consumption of physical goods can be substituted for leisure over time. Considering income and substitution effects over the life cycle, women as workers make lifetime decisions based on their household present and future well-being. As we have mentioned before, which effect dominates will depend on whether they are primary or secondary workers.

Blundell and MaCurdy (1999) propose specifications to determine income and substitution effects in the elasticity being estimated. In our study we estimate intertemporal substitution elasticity or Frisch's elasticity (θ), which measures the response in terms of hours worked to "evolutionary" changes in wages over the whole life cycle, assuming that the marginal utility of wealth remains constant. Figure 1 shows the evolution of wages throughout the life cycle (evolutionary changes). If there are no financial restrictions, we would expect the worker to allocate more time to remunerated work during the years when her wages are highest, which establishes a positive relation between wages earned and the amount of time devoted to work throughout the individual's life cycle (see the evolution of A in Figure 1a and 1b). In this case, the income effect does not apply, and the intertemporal substitution effect means that the correlation

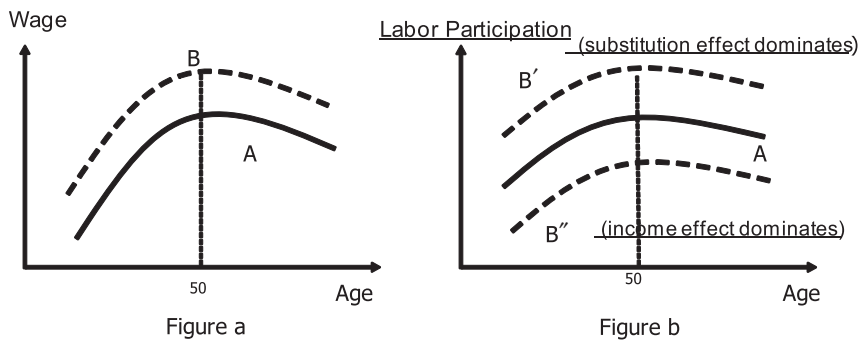


Figure 1 Labor market and life cycle
Notes: A and B represent two hypothetical workers with different life-cycle wage profiles. B′ and B″ represent two alternative labor responses of agent B.

between changes in hours of work and changes in the wage should be positive. As a result, $\theta > 0$.

Following Thomas E. MaCurdy (1981) and Pencavel (2002), our estimations of this elasticity are based on:

$$\ln(h_{k,s}(a)) = w_k + v_s + \sigma\, a + \theta \ln(w_{k,s}(a)) + \varepsilon_{k,s}(a) \tag{1}$$

where $h_{k,s}$ represents the hours worked by individuals in cohort k, with educational level s, and age a, with their real wage (w).

It includes a vector of fixed cohort effects (w_k) and fixed educational effects (v_s), which capture the impact of the constant marginal utilities of wealth for each cohort and each educational level. Thus the specification allows marginal utility to vary among the cohorts in each educational group $(\lambda_{k,s})$, according to wage and wealth differences throughout the life cycle. Notice that $\lambda_{k,s}$ is fixed for each cohort with the same level of schooling. Equation 1 allows us to estimate the intertemporal elasticity (θ). Equation 1 also enables us to estimate elasticities θ_J for the J different educational levels.

Consideration of the life cycle enables us to analyze labor supply responses to changes in wage profiles. For example, Figure 1a shows that B's expected income over her life cycle is greater than A's. For both profiles, θ is positive. However, it is not possible to determine which of the two workers will allocate more time to paid work. If the substitution effect dominates decision making (Figure 1b), as B has a greater opportunity cost for leisure, the time she devotes to remunerated work will increase (B′). However, because B has greater total income in her life cycle, an income effect may dominate, and the time she devotes to leisure may increase (B″). Uncompensated elasticity (δ) measures the response in terms of hours worked when there is an unexpected wage change at age a, and this is associated with a parametric change that affects behavior throughout the life cycle. It measures the effects of a wage profile change on labor supply, which means we must take into account the dependence of $\lambda_{k,s}$ on all wages.

MaCurdy (1981) and Pencavel (2002) propose a model to estimate uncompensated elasticity, where they derive the following equation:

$$\ln[h_{k,s}(a)] = \sum_{i=0}^{2} \mu_{0i} a^i + \sum_{i=0}^{2} \mu_{1t} a^i K + \sum_{i=0}^{2} \mu_{2i} a^i S + \delta \ln[w_{k,s}(a)] + \beta y_{k.s}(a) + u_{k.s}(a) \tag{2}$$

Equation 2 considers how wages alter the marginal utility of wealth over the life cycle. It incorporates the following as explanatory variables: age, age squared, the age–cohort and age–schooling interactions, non-wage incomes $(y_{k,s})$, and real wage. The coefficient associated with this last variable corresponds to uncompensated elasticity $(\delta = \theta + \eta_a)$. We would

expect that the marginal utility of wealth would decrease with real wages and wealth as leisure becomes more valuable, so each η_a coefficient should be negative. Because this equation incorporates the income effect, we arrive at $\delta \leq \theta$. Again, the elasticity δ_J can be estimated for the cohorts with a J educational level.

There is a variation of Equation 2 that includes a quadratic form of the wage, and this serves to evaluate whether the elasticities are constant for women workers with different levels of wage income. In this case, it is supposed that intertemporal and uncompensated elasticities are a linear function of the wage logarithm: $\theta = \theta_0 + \theta_1 \ln(w)$ and $\delta = \delta_0 + \delta_1 \ln(w)$, and a wage quadratic term is included.

To estimate elasticity at the "extensive" margin, the dependent variable $h_{k,s}$ is replaced by ($p_{k,s}$; Pencavel 1998), which represents the participation rate of cohort k with educational level s.[7] Because synthetic cohorts are constructed for an average person, the selection bias problem is mitigated.

The comparison between intertemporal and uncompensated elasticities enables us to quantify the magnitudes of the substitution and income effects. The techniques applied allow us to carry out an exercise of measuring and interpreting women's labor supply decisions over the period of the sample, evaluating the differences among women. Our estimations are based on indicators that arise from creating pseudo-panels of cohorts built up on the basis of cross-section surveys.[8] The criteria for pseudo-panel construction enable us to analyze the presence of differences in the elasticities for different generations and educational levels.

Pseudo-panel data represent an "average individual," so they do not enable us to consider heterogeneity within the cohorts; but they do allow us to make observations over time. The construction of pseudo-panel data presents a trade-off between the number of cohorts and the number of observations in each cohort (Baltagi 2005). A large number of cohorts captures more heterogeneous behaviors with fewer individuals per cohort, affecting representativeness. But fewer cohorts, each one averaging more observations, increase heterogeneity and representativeness within each cohort resulting in less bias and less variability in the pseudo-panels estimates.

This provides a strong criterion for constructing homogeneous pseudo-panels. However, the parameters we estimate have to be interpreted as the elasticity of an average woman.

Estimation procedures

Following Pencavel (2002), we use weighted least squares (WLS); the weights are given by the number of observations in each cell. We estimate standard errors by the White procedure and test for heteroscedasticity (Deaton 1985; Pencavel 1998, 2002).

We use the instrumental variables approach. Consistency requires instruments to be uncorrelated with (that is, exogenous to) the error term and simultaneously correlated with wages. We assess the quality of the instruments and the magnitude of the potential bias following John Bound, David A. Jaeger, and Regina M. Baker (1995).[9] They propose testing the joint significance of the instruments in the auxiliary equation of the two-stage method (Espino et al. 2014b).

Under certain circumstances, the use of cohort mean values themselves serves as an instrumental variable procedure (Heckman and Robb 1985). Following Pencavel (1998, 2002) and Donald Robbins, Daniel Salinas, and Araceli Manco (2009), we use two groups of variables as instrumental variables for wages. In the first specification, instrumental variable A (IVA), we use imports and the real exchange rate as instrumental variables interacting with each other, and each of them interacts with a fourth-degree polynomial of age and years of education (IVA; Pencavel 1998, 2002). These variables are candidates to be used as instruments because foreign trade variables are associated with elements that shift labor demand functions.[10] Furthermore, their effect on labor supply is only through wages.[11] These variables have been used in previous analyses of wage response in Uruguay – Carlos Casacuberta and Marcel Vaillant (2002) find a link between wages and the external trade variables of the different sectors.

In the second specification we propose, instrumental variable B (IVB), women's wages are instrumented through the wages of single men in a same educational-cohort cell. The basis for the selection of this instrument is that the two wages are correlated, but it is expected that the wages of single men will be exogenous to the decision of how many hours women work.

Other non-wage home incomes are also treated as endogenous in the specifications of uncompensated elasticity. In the case of IVA, we use the same instruments. In the case of the IVB instruments, we introduce the non-wage income of single men for the non-wage income of women. We also add two variables in this case: the interaction between education and imports, and the interaction between the real exchange rate and imports. In the auxiliary regression, the four instruments – the wage and the other incomes of single men and the two variables of external trade – are significant, both in the wage regression and in the other non-wage income regression (Espino et al. 2014b).

Because we only observe the hours worked of women who decide to participate, another element to consider is sample selection bias due to self-selection or incidental truncation. The resulting bias could be especially large when estimating women's labor supply if there are unobservable factors influencing their decisions about participation and about hours allocated once the women have joined the labor market (Heckman 1979). The literature is not conclusive about the best way to treat this problem

when pseudo-panels are used in the estimation, and we follow the proposal of Pencavel (1998).[12]

DATA SOURCE

This article uses monthly data from the Encuesta Continua de Hogares (ECH), Instituto Nacional de Estadística (INE; the Uruguayan National Statistics Institute, Continuous Household Surveys) for the period 1986–2010. This survey provides information on paid work and income.[13] For the entire period, the survey is representative of all individuals and households from all urban areas in Uruguay with more than 5,000 inhabitants. Constructing synthetic cohorts implies weighting the observations at the micro-data level according to the population projection for any age-gender group for each year. Each cohort is defined as a group of individuals sorted into five-year birth cohorts and then into four schooling classes.[14] There are ten such birth cohorts from 1932–6 to 1977–81. For the oldest cohort born in 1932–6, only their last seven years (from 54 to 60 years old) are observed, while for the youngest cohort born in 1977–81, only their first five years (from 25 to 29 years old) are observed (Espino et al. 2014b). To avoid the distortions caused by education and the retirement stages, we only use information from individuals between 25 and 60 years old.[15]

To estimate the parameters of interest for Equations 1 and 2, the indicators alternatively used are average hours worked by people in the cohort as an indicator of labor supply (intensive margin) and their levels of participation (extensive margin). In the former, the micro-data we use correspond to everyone who received wage incomes, and in the latter, all the people in each cohort are considered. The elasticities estimations use hours and incomes on the main job.[16]

DESCRIPTIVE ANALYSIS

In what follows, we analyze the intergenerational, educational, and life-cycle evolution of women's labor force participation, hours worked, and wage income in Uruguay. Since the mid 1980 s, women's labor force participation has continuously increased independent of economic cycles. Women with six or less years of education have the lowest participation levels. The most important increases have occurred among women with intermediate educational levels (see Figures 2a and 2c).

Educational levels affect labor force participation rates. The most stable participation rates throughout the life cycle can be found among women with intermediate educational levels. In all cases, women's labor force participation rate increases until the age of 30 and decreases after age 50 (Figure 2d).

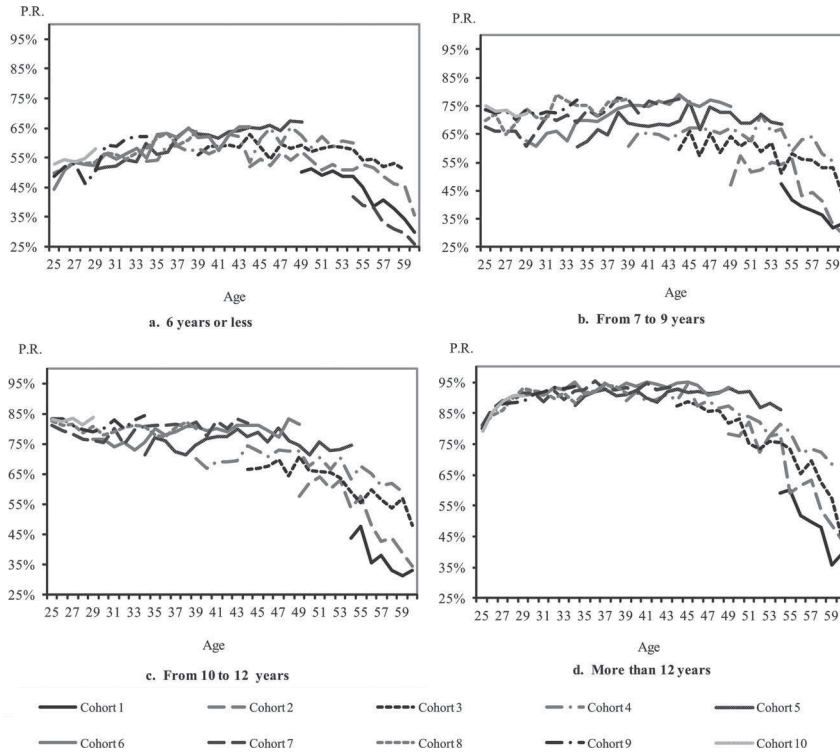


Figure 2 Women's participation rate per cohort according to age and years of schooling (%). Total for Uruguay (towns with more than 5,000 inhabitants)

The evolution of hours worked, on average, by women shows younger generations working fewer hours than older ones. Among women with ten to twelve years of education, the number of hours worked is relatively stable throughout the life cycle and across generations. Lastly, those with more than twelve years of education confirm the behavior predicted by the life-cycle models (Figure 3d) – they work fewer hours than women with ten to twelve years of education.

In Uruguay, most highly educated women work fewer hours (32 hours in the main activity).[17] However, these women are the only group of workers whose average hours worked in a given age bracket is higher among younger cohorts.

In general, the evolution of real wage (expressed in logarithms) shows a slight growing trend with age (Figure 4).[18] For women with more than twelve years of education, wage per hour increases with age and wages also increase among more recent cohorts. But for women with less education (that is, ten to twelve or ten or less) wages per hours were nearby unchanged among cohorts and show a flatter, but slightly rising, trend over

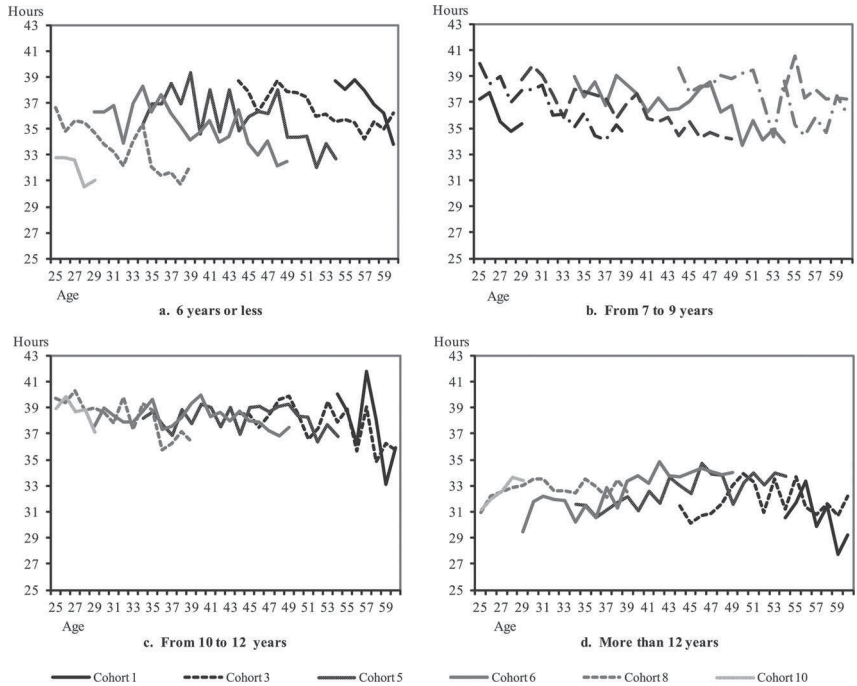


Figure 3 Average hours worked by women in their main activity by cohorts according to age and years of education. Total for the whole country (towns with more than 5,000 inhabitants)
Note: For clarity, only the following cohorts are shown: 1,3,5,6, 7, and 10.

time. For the most recent cohort (cohort 10), the starting point of wage per hour was lower than all previous cohorts. There was a fall in real wages that resulted from a deep economic and financial crisis at the beginning of the twenty-first century. This contrasts with the series found by Pencavel (2002) in the US for the period 1975–94, in which real wages increased steadily with age and cohort.

It is relevant to note that regardless of wage fluctuations, women's participation rates have increased steadily during the whole period. Even while working fewer hours, on average, the more educated group has a higher participation rate and their labor behavior is more consistent with the life-cycle model. In general, the younger generations of women have higher participation rates, but, as mentioned above, there has been a slight decrease in the hours they work. Therefore, even though the trend in participation coincides with that in the US, the evolution of hours worked is different as Pencavel (1998) found an increase among younger generations (for the same age cohort).

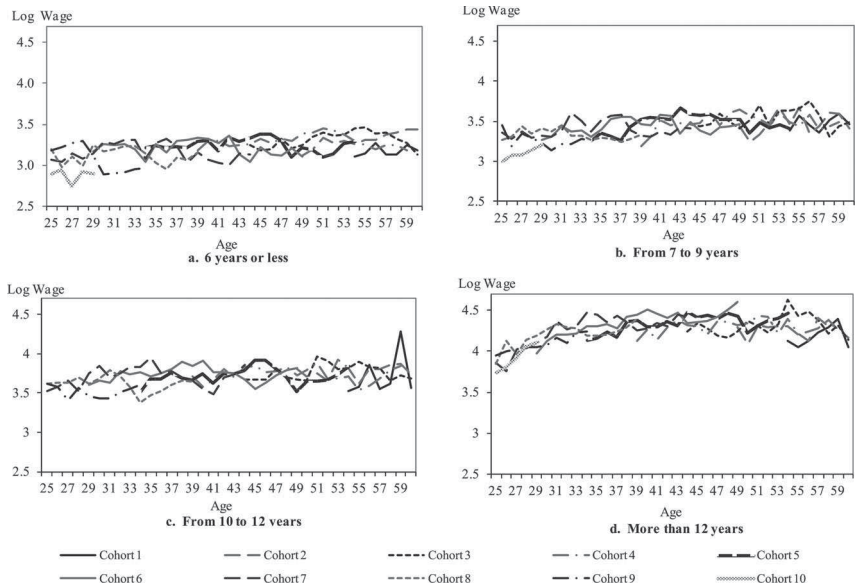


Figure 4 Average hourly wage in women's main activity, per cohort for education years. Total for the whole country (towns with more than 5,000 inhabitants)

The analysis above shows that there are differences between women with less than twelve years of education and those with twelve years or more. This finding justifies the criterion we employed in our specifications for the econometric analysis and is consistent with the outcomes that Espino, Leites, and Machado (2009) found for Uruguay.

THE ELASTICITY OF WAGE LABOR SUPPLY

We estimate intertemporal and uncompensated elasticities by educational groups distinguishing between women with tertiary education and those without. Our selection of education ranges is based on the descriptive analysis above and on findings in the literature that show that women with tertiary education have their own distinct labor market behavior, which is relatively similar to the pattern among men (Espino, Leites, and Machado 2009).

We analyze labor supply in terms of (*i*) hours worked (intensive margin) and (*ii*) participation (extensive margin).

Elasticities at the intensive margin

For each education group, intertemporal elasticity is greater or equal to uncompensated elasticity (Table 1 and Table 2). Our statistical tests show

Table 1 Women's intertemporal elasticities according to educational groups

Dependent variable: Working hours (main occupation)	*Without tertiary education*		*With tertiary education*	
	IVA	*IVB*	*IVA*	*IVB*
log(w)	0.296***	0.292***	0.120***	0.024
Difference significance test among estimations for different educational groups				
Based on IV-A	$F(1,572) = 28.98$; p-value $= 0$			
Based on IV-B	$F(1,572) = 11.26$; p-value $= 0$			

Notes: IVA: interaction among imports and age, age squared, age cubed, and age to the fourth power. Interaction among real exchange rate and age, age squared, age cubed, and age to the fourth power. Interaction between education and imports. Interaction between education and real exchange rate. Interaction between real exchange rate and imports. IVB: Wage per hour and other income for single men. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

that women without tertiary education have greater intertemporal and uncompensated elasticity compared to other women.

In the case of women without tertiary education, the magnitudes of intertemporal and uncompensated elasticities estimated is consistent with what the mainstream literature expects for secondary workers. Both estimated elasticities confirm a strong substitution effect, that is, when relative wages increase, more women work, and they work more hours. These findings support rejecting the hypothesis that women's behavior is governed by the rationality of the added worker, which posits an increase in participation as a result of deterioration in labor market conditions, through the entering of other family members to the labor market. When we compare intertemporal and uncompensated elasticity magnitudes, it can be seen that the income effect is very weak among both groups of women.

As regards uncompensated elasticity, in the group of women with more education, we observe a magnitude similar to that of men (between 0 and 0.186, based on Espino et al. [2014a]) These last results could be related to the hypothesis suggested by Goldin (2006) about changes in the "horizon" and "identity" of women workers. Intertemporal elasticity shows that both groups of women optimize their labor decisions over the life cycle. This implies that they anticipate that their labor force participation will have a longer and more stable horizon. Moreover, these women probably strengthen their "identity" as workers and appreciate their working careers, and – particularly in the group of more highly educated women – their behavior is more similar to that of men. It was expected that more educated women would decide to enter the labor market; the new trend is the labor market entry of less-educated women, which is led

Table 2 Women's uncompensated elasticities according to educational groups

Dependent variable: Working hours (main occupation)	*Without demographic controls*				*With demographic controls*			
	Without tertiary education		*With tertiary education*		*Without tertiary education*		*With tertiary education*	
	IVA	*IVB*	*IVA*	*IVB*	*IVA*	*IVB*	*IVA*	*IVB*
log(w)	0.296***	0.251***	0.103*	0.046	0.269***	0.228***	0.124**	0.051
log(other non-wage income)	− 0.004	0.064***	− 0.033	− 0.029	0.009	0.073***	− 0.023	− 0.023
Other controls								
Presence of children					− 0.316***	− 0.320***	− 0.147***	− 0.135**
Married or with domestic partner					0.177**	0.265***	0.087	0.066
Difference significance test among estimations for different educational groups								
Based on IVA	$F(1,580) = 10.91$; p-value $= 0.001$				$F(1,576) = 5.61$; p-value $= 0.0182$			
Based on IVB	$F(1,580) = 9.3$; p-value $= 0.0024$				$F(1,576) = 6.34$; p-value $= 0.0121$			

Notes: IVA: interaction among imports and age, age squared, age cubed, and age to the fourth power. Interaction among real exchange rate and age, age squared, age cubed, and age to the fourth power. Interaction between education and imports. Interaction between education and real exchange rate. Interaction between real exchange rate and imports. IVB: Wage per hour and other income for single men. Interaction between education and imports. Interaction between real exchange rate and imports. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

by younger generations. Even though the amount of time women with lower educational levels devote to paid work has increased, it seems that the role of "secondary worker" still prevails because the substitution effect dominates uncompensated elasticities.

The coefficient for non-wage household income is not significant in most cases (Table 2), which indicates similar behavior to that of men (Espino, Leites, and Machado 2009). Nonetheless, these results are not robust, which means we cannot draw convincing conclusions about this issue. Pencavel (2002) argues that these estimates suffer from limitations when it comes to measuring effects not related to wage income and discusses the sources of the problem. Moreover, the presence of children in the home has a significant effect, which is negative and of greater magnitude among women without tertiary education. This finding is associated with the constraints that an unpaid workload, childcare, and housekeeping tasks place on women when they consider participating in the labor market, since for economic reasons they may be unable to resort to private services, to employ workers provided by the market or remunerated domestic service, or lack public services.[19] Lastly, among married women without tertiary education, the marriage (or having a partner) variable is positively associated with average hours worked, which is an unexpected result. The latter result is in line with a low-income effect in women's behavior.

Following Chinhui Juhn, Kevin M. Murphy, and Robert H. Topel (1991) and Pencavel (2002), we evaluate differences in elasticity magnitudes among different wage profiles by educational groups and cohorts in order to validate the estimations above. For these tasks a quadratic term is included in wages. The hypothesis that elasticities decrease with wage earnings cannot be rejected with this evidence. The θ_1 and δ_1 parameters are significantly negative in most cases. These results are consistent with the cited references, which indicate that the elasticities are lower for workers with higher qualifications, which is consistent with the findings presented in the paragraph above (Table 3).

Elasticities at the extensive margin

Following Pencavel (1998), the participation rate of each cohort is used as the dependent variable. This allows us to estimate the elasticities at the extensive margin from Equations 1 and 2. The sign of the intertemporal elasticity of participation in the labor market is positive, which contrasts with findings at the intensive margin: women with higher levels of education have higher coefficients at the extensive margin (Table 4), although the difference is not statistically significant.[20] Both groups of women adjust their labor participation to their life-cycle wages. This constitutes additional evidence against the added-worker effect among

Table 3 Women's intertemporal and uncompensated elasticities assuming a nonlinear relationship with income

Dependent variable: Working hours (main occupation)	*Intertemporal*		*Uncompensated*	
	IVA	*IVB*	*IVA*	*IVB*
log(w)	0.727*	2.034***	1.060***	4.36***
log(w)*log(w)	− 0.060	− 0.231***	− 0.137***	− 0.55***
log(other non-wage income)			− 0.159***	0.1535**

Notes: For IVA and IVB, please see notes to Table 2.

Table 4 Women's intertemporal elasticities at the extensive margin, according to educational group

Dependent variable: Participation rate	*Without tertiary education*		*With tertiary education*	
	IVA	*IVB*	*IVA*	*IVB*
log(w)	0.303***	0.309***	0.396***	0.330***
Difference significance test among estimations for different educational groups				
Based on IVA		$F(1,572) = 2.61$; p-value = 0.11		
Based on IVB		$F(1,572) = 0.04$; p-value = 0.84		

Notes: For IVA and IVB, please see notes to Table 1.

less educated women. Moreover, women with tertiary education are more sensitive to wages at the extensive margin than at the intensive one. This is consistent with the fact that they incur higher opportunity costs for not participating in the labor market at their central ages, and that they access more flexible conditions of work, which allows them to adapt their conditions of work to make them compatible with maternity and household tasks, so once they enter the labor market they do not have to leave for reasons other than remuneration profiles. Additionally, as they earn higher wages and as care responsibilities are not equally assumed by women and men within households, they can hire market services and thus have greater opportunities to combine their gender role at home (care and domestic unpaid work) with labor market participation.

As regards uncompensated elasticity, the magnitude of the coefficient for women with tertiary education is lower than for the other group, and in most specifications not significantly different from zero. However, for women without tertiary education, the uncompensated elasticity is still positive, which indicates that the substitution effect predominates. The statistical tests we performed lead us to reject the notion that uncompensated elasticities are the same among educational groups for both groups of instruments (Table 5).

Table 5 Women's uncompensated elasticities at the extensive margin according to educational groups

Dependent variable: Participation rate	*Without demographic controls*				*With demographic controls*			
	Without tertiary education		*With tertiary education*		*Without tertiary education*		*With tertiary education*	
	IVA	*IVB*	*IVA*	*IVB*	*IVA*	*IVB*	*IVA*	*IVB*
log(w)	0.236***	0.216***	0.038	− 0.004	0.214***	0.198***	0.076*	0.016
log(other non-wage income)	0.071***	0.091***	− 0.037	− 0.017	0.079***	0.095***	− 0.006	− 0.018
Other controls								
Presence of children					− 0.264***	− 0.272***	− 0.039	− 0.026
Married or with domestic partner					0.087	0.109	0.244***	0.213**
Difference significance test among estimations for different educational groups								
Based on IVA	F(1,580) = 17.76; *p*-value = 0.000				F(1,576) = 9.95; *p*-value = 0.0017			
Based on IVB	F(1,580) = 20.36; *p*-value = 0.000				F(1,576) = 13.38; *p*-value = 0.0003			

Notes: For IVA and IVB, please see notes to Table 2. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

These findings are the same when the specifications include the demographic variables. The presence of children under 6 years old in the home has a negative impact on the probability that women with no tertiary education will participate in the labor market, whereas this impact is nonexistent for the other group. This is consistent with the idea expressed above that more educated women have advantages when it comes to coordinating household work with paid work.[21]

Intergenerational changes

When intertemporal elasticity is estimated for all women, the specifications demand the incorporation of a fixed effect on different generations' levels, which is $(\lambda_{k,s})$.[22] Even though the estimations of this parameter may suffer from some consistency problems, these are attenuated when the cohorts are observed over a long period of time and are composed of a high number of observations.

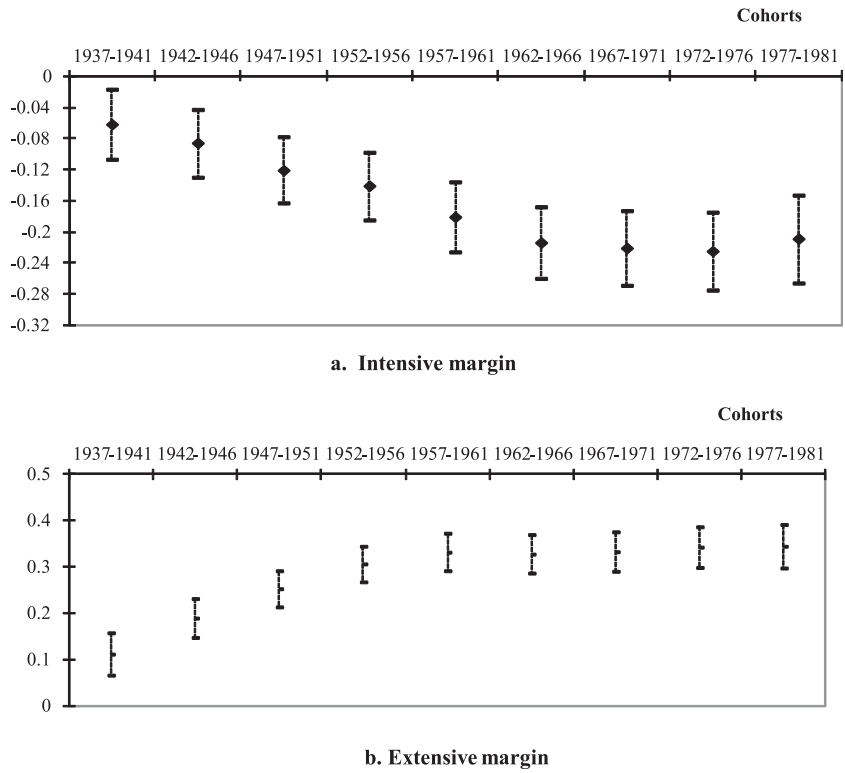
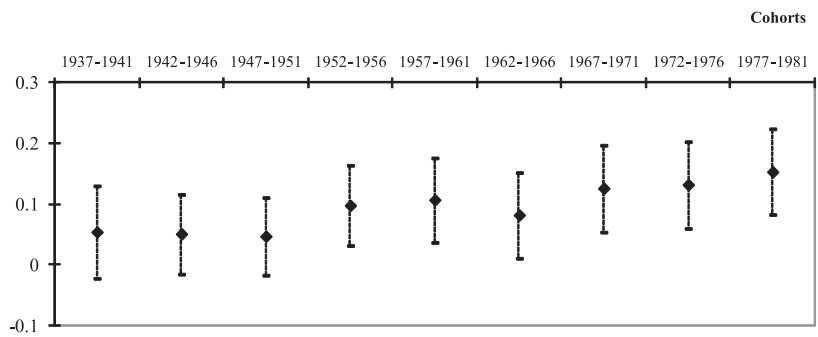


Figure 5 Cohort effect at the intensive and extensive margins (point estimates and intervals of confidence)

The estimates of "cohort effects" show a discrete change among generations in average working hours and the levels of participation. As shown in Figure 5, a decreasing trend in the average number of hours worked is found for the younger cohorts. The application of regular statistical tests enables us to affirm that the cohort effect is significantly lower in the 1972–76 and 1977–81 cohorts than in the 1942–6 and 1947–51 cohorts.

A direct interpretation of these parameters comes from the specifications used, which represent a logarithmic transformation of the marginal utility of initial wealth. This decreasing trend could be associated with the fact that the wage profile of younger women throughout their life cycle is relatively high compared to their older peers. This result is in line with the model predictions, which assert that the marginal utility of wealth decreases with respect to wage profile (MaCurdy 1981).

A. Women without tertiary education



b. Women with tertiary education

Figure 6 Cohort effect at the intensive margin according to educational group
Note: The estimates of cohort effects are based on the results in Table 1 using IVA.

On the other hand, younger generations' participation has a rising trend that ceases at the generations born between 1957 and 1961. This trend could be associated with a higher opportunity cost of not participating in the labor market and is also in line with Goldin's (2006) hypothesis.

The fixed effects are also analyzed for women with and without tertiary education in order to ascertain whether the cohort effect operates differently depending on education (Figure 6). The observed drop in the cohort effect is more pronounced for less educated women, who have greater intergenerational differences. Among the more educated women, the generational differences are not significant, which is consistent with the fact that they were the first group to enter the labor market. Apart from the more educated women, the group that has always joined the labor market at the youngest age is women from the poorest households; therefore, the drop in the cohort effect for women without tertiary education could respond to the recent entry of those with intermediate educational levels (see Figure 2). These women are under less financial pressure than the poorest group, and when they obtain paid work they carry on doing their household tasks and consequently work fewer hours at their jobs.

CONCLUSIONS

In this paper, we measure the relation between labor and wages and assess the impact of wage movements on women's labor force participation, which has undergone a marked and secular increase in the context of significant variations in real wages due to macroeconomic shocks. Our findings also suggest that women's labor behaviors vary depending on years of schooling and are also affected by cultural, social, and demographic changes.

We find evidence that intertemporal elasticities are high and positive at the intensive and extensive margins, which indicates that women adjust their labor behavior to their life-cycle wages. These results coincide with the findings of previous research in developed countries, and they differ from the findings in other developing countries as regards the elasticities found. Furthermore, we confirm the existence of different behaviors within women's labor supply.

Our descriptive analysis shows that the levels of women's participation in the Uruguayan labor supply have risen in the last three decades. In all female educational groups the more recent cohorts have higher participation levels, although recently this trend has been intensified among women without tertiary education. The labor behavior of women with more years of schooling is more stable among generations. At the same time their labor market participation is relatively similar to men's, and this behavior is consistent with the life-cycle model predictions. The positive

association between participation in the labor market and education is confirmed.

In general, the intertemporal elasticity of each educational level is positive and higher or equal to the uncompensated elasticity, and women without tertiary education always have greater uncompensated elasticities than the other group. At the intensive margin, less educated women also have greater intertemporal elasticities; but at the extensive margin, women with tertiary education have equal or greater intertemporal elasticities than their less educated counterparts. These results confirm that all the groups of women optimize their time of paid work allocation throughout their life cycle, and they tend to participate more at the ages when they can earn higher wages. These results also highlight an important difference among educational groups. Women with less education tend to react strongly to unexpected changes in wages – which is a feature of a secondary labor force – whereas women with tertiary education show no reaction to abrupt wage changes, which can be interpreted as a clear sign that they have strong worker identity. Moreover, they likely have access to care services in the household or the market, and they are not affected by wage volatility because they are still able to control these services and face the fixed costs of going to work.

Women with tertiary education have a stronger optimization pattern in their life cycle, albeit through participation rates rather than through hours of work. This could be related to the fact that they postpone entry into the labor market in order to accumulate human capital, which means they enter into it at ages associated with higher wages (it is shown that the wage profile of these groups coincides with what life-cycle theories predict). But this behavior might also suggest that when they have to devote time to unpaid care responsibilities and domestic tasks in the home, they adjust the length of their workday rather than leaving the labor market. This highlights once again that women in this group have strong worker identity and are perhaps aware of the cost to their careers that periods of inactivity cause. In this respect, their behavior has become more similar to that of men.

From a theoretical point of view, given the wage profile of women with less education and the lower opportunity cost of their not working, it is expected that their behavior could be explained by added-worker rationality. However, the relatively high intertemporal elasticity and positive uncompensated elasticity found in this study provides evidence against this hypothesis.

These findings could be interpreted in the light of Goldin's (2006) hypothesis: when women make decisions about labor market entry, they anticipate that their participation will be more stable and have a wider horizon. Moreover, they probably strengthen their "identity" as workers and appreciate their working career more.

Lastly, we find evidence that there are intergenerational changes in the marginal utility of wealth. The wages earned by younger generations throughout their life cycle are relatively higher than the wages their peers in the previous generations received, and this might mean that wealth has lower marginal utility, which is in line with the model predictions. This indicates that women in younger generations have a better wage profile. There is a supplementary hypothesis here – namely that preferences have changed, and these younger generation women place more value on their careers.

To sum up, we can affirm that the younger generations of women have greater participation in the market, but their average working week is shorter. The different behaviors at the intensive margin could be associated with the entry of women who are married or have a partner. The paid work participation of these women has increased the most, but at the same time they continue to fulfill their responsibilities in the home.

The trend of women's rising paid work participation is expected to continue. The implications of this trend at the intensive margin are ambiguous and depend on how far women – especially those with less education – are able to coordinate paid work with their household and family responsibilities. A very important aspect here is the design of public policies to facilitate women's entry into the labor market and cater to their different wage profiles and home care demands. While women with more education appear to be better positioned to conciliate paid work with their household responsibilities, the situation of less educated women represents the main challenge for policy design. The latter group belongs to households with higher home care demands (and fewer economic resources), while they have low wage profiles. This has practical consequences not only as regards the provision of quality services but also in terms of promoting co-responsibility between women and men.[23] As mentioned above, the possibility of women coordinating paid work with unpaid work depends very much on personal and household income. The trend of women's increased labor participation does not indicate that all women want to enter the labor market, but all women should be as free as men to choose what kind of work they do and how much time they devote to it.

As mentioned above, the possibility for women to coordinate paid work with unpaid work depends very much on personal and household income. This highlights the importance of public policies to encourage women's labor market participation and also to achieve the goal of gender equality. This involves the shifting of responsibility, power, and control from families to the state, from mothers to fathers, and from care providers to those receiving care and support. In this sense, the Uruguayan Parliament is discussing a law for the regulation of a System of Care in Uruguay as a new pillar of the Social Protection System.[24]

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NOTES

[1] Because they are poorer and have lower income effect.

[2] Marginal utility refers to the change in individual welfare derived from one additional unit of wealth.

[3] James J. Heckman and Thomas MaCurdy (1980) develop a model based on panel data to estimate intertemporal elasticities; Richard Blundell, Costas Meghir and Pedro Neves (1993) estimate intertemporal elasticities for female supply and compare women with children to those without children; Pencavel (1998) distinguishes between married and single women; Donald Robbins, Daniel Salinas and Araceli Manco (2009) find little intertemporal elasticity – and even elasticity close to zero.

[4] The World Bank (2015) ranked Uruguay as a high-income country with a gross national income per capita of US$16,810 in 2014.

[5] According to the more recent figures available in the World Bank database, the fertility rate was 2.0 for Uruguay, 1.7 for OECD countries, and 1.9 for upper-middle-income countries, while the life expectancy at birth is 80.6, 82.7, and 76.3, respectively.

[6] 55.6 and 0.73 percent in Uruguay, and 50.9 and 0.74 percent in OECD countries.

[7] Despite the limitation of this model assuming a "unitary" conceptualization of household labor decisions (see for example bargaining models and intrahousehold dynamics from a gender perspective in Agarwal [1997]). Nonetheless, when incorporating decisions throughout the life cycle, the intermissions in remunerated work participation that characterize the secondary worker's decisions can be captured by the analysis.

[8] There are three advantages to using pseudo-panels: they enable us to approach the intertemporal distribution of hours worked more closely (which is not possible with cross-section information); they can minimize bias due to errors in variable measurement at the micro-data level because they use averages or similar statistics by cohort; and they allow us to incorporate macroeconomic variables (Heckman and MaCurdy 1980; Pencavel 2002). In addition, pseudo-panels do not suffer from the problem of attrition (Deaton 1985; Antman and McKenzie 2005).

[9] Bound, Jaeger, and Baker (1995) point out that the F statistical value below 10 would confirm the weakness of the instrument and the bias problems.

[10] Pencavel (1998, 2002) justifies the use of external trade variables as an instrument by citing evidence found in previous studies in the US that indicate a link between these variables and the structure and level of wages.

[11] Uruguay is a small open economy and as such is an international price taker, but the real exchange rate reflects the country's overall global competitiveness as well as its monetary policy and exchange rate policy.

[12] Alma Espino et al. (2012) included the projected job ratios as selection term in the estimation of women elasticities. However, their results do not have significant differences with and without this selection term.

[13] Wages and incomes are deflated by the price consumption index, so they are expressed in real terms.

[14] The definition of educational ranges is based on years of schooling completed: up to six years; between seven and nine years; between ten and twelve years of schooling; and more than twelve years.

[15] The percentage of people in each cohort by educational level shows that the levels reached at 25 years old remained almost unchanged. Espino et al. (2014b) show the number of observations per cohort over time.

[16] The basics of this decision are in Espino et al. (2014a, 2014b) where the construction criteria for the variable used in the estimations is also summarized.

[17] It must be taken into account that women with more education tend to be overrepresented in sectors and occupations that involve fewer working hours. In this sense, women's participation in the public sector and in health and education activities is relatively high. In 2010, the average hours worked in feminized sectors were 35.7 (social and health services), 32.9 (other community, social, and personal services), and 29.3 (education); other sectors with male predominance have more than 40 hours worked on average (INE 2010b).

[18] Lifetime wages will continuously increase, with a steeper or flatter slope; however, in the short term, changes in real wages can be very pronounced depending on inflation.

[19] The presence of children in the home increases women's reservation wage, which lessens the probability that they will participate in the labor market. The costs involved in childcare depend on the availability of care options including whether relatives or friends are willing to provide care at a low or no cost (Deutsch 1998).

[20] Considering that significant differences exist among women who compose the group without tertiary education (the dichotomous variables for educational ranges 2 and 3 are significant), we performed the regression for this group both with and without controls for years of education.

[21] Among these, the percentage of women who are married or have a partner at the cell level has a positive impact, but we are unable to give an immediate interpretation of this effect. However, this last result is not robust, and in general the estimations of this coefficient are not significantly different from zero.

[22] These fixed or cohort effects result from the estimation Equation 1 using IVA, without distinguishing by education groups. That is to say, it shows an average change between generations.

[23] Jill Rubery et al. (2001) study the need to implement public policies that are compatible with gender equality in the market for the case of Europe.

[24] The law is based on at least four arguments that are related to the needs of economic development: improvement of quality care, the lack of care services provisions due to greater demand of care, the decreasing number of people who are in a position to exercise care responsibilities, and finally, from a normative view, the gender equality and economic autonomy of women.

REFERENCES

Agarwal, Bina. 1997. "'Bargaining' and Gender Relations: Within and Beyond the Household." *Feminist Economics* 3(1): 1–51.

Antman, Francisca and David McKenzie. 2005. "Poverty Traps and Nonlinear Income Dynamics with Measurement Error and Individual Heterogeneity." Policy Research Working Paper Series 3764, World Bank.

Baltagi, Badi H. 2005. *Econometric Analysis of Panel Data.* 3rd ed. West Sussex, UK: John Wiley & Sons.

Bassi, Marina. 2003. "Do Wages Really Matter? Understanding Female Labor Force Participation." Paper presented at the 8th annual meeting of the Latin American and Caribbean Economic Association (LACEA), Puebla, Mexico, October 9–11.

Bértola, Luis and Fernando Lorenzo. 2004. "Witches in the South: Kuznets-Like Swings in Argentina, Brazil and Uruguay since the 1870s." In *Explorations in Economic Growth*, edited by J. L. van Zanden and S. Heikkinen, 299–320. Amsterdam: Aksant.

Blau, Francine D. and Lawrence M. Kahn. 2005. "Changes in the Labor Supply Behavior of Married Women: 1980–2000." Working Paper 11230, National Bureau of Economic Research.

Blundell, Richard and Thomas MaCurdy. 1999. "Labor Supply: A Review of Alternative Approaches." In *Handbook of Labor Economics Vol. 3A*, edited by Orley Ashenfelter and David Card, 1559–695. Oxford: Elsevier North-Holland.

Blundell, Richard, Costas Meghir, and Pedro Neves. 1993. "Labour Supply and Intertemporal Substitution." *Journal of Econometrics* 59(1–2): 137–60.

Bound, John, David A. Jaeger, and Regina M. Baker. 1995. "Problems with Instrumental Variables Estimation When the Correlation between the Instruments and the Endogenous Explanatory Variable Is Weak." *Journal of the American Statistical Association* 90(430): 443–50.

Casacuberta, Carlos and Marcel Vaillant. 2002. "Trade and Wages in Uruguay in the 1990's." Working Paper 902, Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la República, Uruguay.

Deaton, Angus. 1985. "Panel Data from Time Series of Cross-Sections."*Journal of Econometrics* 30(12): 109–26.

Dessing, Maryke. 2002. "Labor Supply, the Family and Poverty: The S-shaped Labor Supply Curve." *Journal of Economic Behavior and Organization* 49(4): 433–58.

Deutsch, Ruthanne. 1998. "Does Child Care Pay?: Labor Force Participation and Earnings Effects of Access to Child Care in the Favelas of Rio de Janeiro." Working Paper 384, Inter-American Development Bank.

Espino, Alma, Fernando Isabella, Martín Leites, and Alina Machado. 2012. "Elasticidad intertemporal y no compensada de la oferta laboral. Evidencia para el caso uruguayo" [Uncompensated and intertemporal elasticity of labor supply: Evidence for Uruguay]. Working Paper Series DT18/12, Instituto de Economía, Universidad de la República, Uruguay.

———. 2014a. "Diferencias de género en la elasticidad intertemporal y no compensada de la oferta laboral. Pruebas para el caso uruguayo" [Gender differences in the uncompensated and intertemporal elasticity of labor supply: Evidence for Uruguay]. *Trimestre Económico* 322 (April–June): 479–515.

———. 2014b. "The Inter-Temporal Elasticity of Female Labor Supply in Uruguay: Analysis Based on Pseudo-Panels for Different Education Groups and Generations." Working Paper Series DT11/14, Instituto de Economía, Universidad de la República, Uruguay.

Espino, Alma, Martín Leites, and Alina Machado. 2009. "El aumento en la oferta laboral de las mujeres casadas en Uruguay" [The increase in female labor supply in Uruguay]. *Desarrollo y Sociedad* 64: 13–53.

Goldin, Claudia. 2006. "The Quiet Revolution That Transformed Women's Employment, Education, and Family." *American Economic Review* 96(2): 1–21.

González, Roberto and Héctor Sala. 2011. "The Frisch Elasticity in the Mercosur Countries: A Pseudo-Panel Approach." Discussion Paper Series 5993, Institute for the Study of Labor.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1): 153–61.

Heckman, James J. and Thomas MaCurdy. 1980. "A Life Cycle Model of Female Labor Supply." *Review of Economic Studies* 47(1): 47–74.

Heckman, James J. and Richard Robb. 1985. "Alternative Methods for Evaluating the Impact of Interventions." *Journal of Econometrics* 30(1–2): 239–67.

Instituto Nacional de Estadística (INE). 2010a. *Anuario Estadístico* [Statistical yearbook]. http://www.ine.gub.uy/documents/10181/37497/ANUARIO_TOTAL.pdf/e01a0321-967b-47d7-a7fd-ed44393f7462.

———. 2010b. *Principales resultados 2010. Encuesta Continua de Hogares* [2010 Main results: Continuous household surveys]. http://www.ine.gub.uy/documents/10181/37924/ECH+2010.pdf/88305e3c-d702-4d13-94df-3bd6f9b26372.

———. 2014. *Atlas sociodemográfico y de la desigualdad del Uruguay*, Fascículo 4 [Sociodemographic and inequality atlas for Uruguay]. http://www.ine.gub.uy/documents/10181/34017/Atlas_fasciculo_4_jovenes.pdf/c19f7b00-c004-4e35-ace5-8d38ded573dd.

Juhn, Chinhui, Kevin M. Murphy, and Robert H. Topel. 1991. "Why Has the Natural Rate of Unemployment Increased over Time?" *Brookings Papers on Economic Activity* 2: 75–142.

MaCurdy, Thomas E. 1981. "An Empirical Model of Labor Supply in a Life Cycle Setting." *Journal of Political Economy* 89(6): 1059–85.

Pellegrino, Adela. 2010. "La población uruguaya. Breve caracterización demográfica" [The Uruguayan population: A brief demographic characterization]. UNFPA, Montevideo, Uruguay.

Pencavel, John. 1998. "The Market Work Behavior and Wages of Women 1975–94." *Journal of Human Resources* 33(4): 771–804.

———. 2002. "A Cohort Analysis of the Association Between Work Hours and Wages Among Men."*Journal of Human Resources* 37(2): 251–74.

Robbins, Donald, Daniel Salinas, and Araceli Manco. 2009. "La oferta laboral femenina sus determinantes: evidencia para Colombia con estimativas de cohortes sintéticas" [Female labor supply and its determinants: Evidence for Colombia through estimates of synthetic cohorts]. *Lecturas Económicas* 70: 137–63.

Rubery, Jill, Mark J. Smith, Dominique Anxo, and Lennart Flood. 2001. "The Future of European Labor Supply: The Critical Role of the Family." *Feminist Economics* 7(3): 33–69.

World Bank. 2015. "Uruguay: Panorama general" [Uruguay: Country overview]. http://www.bancomundial.org/es/country/uruguay/overview.

———. 2016. "Uruguay: World Development Indicators." http://databank.worldbank.org/data/reports.aspx?source=2&country=URY.